VOL. XXVIII NEW YORK—THURSDAY, APRIL 3, 1913—CHICAGO NO. 14

The AUTOMOBILE

Floods Damage Automobile Centers

Dayton and Indianapolis Bear a Large Portion of the Loss by Fire and Water

¶ *The floods through Ohio and Indiana and the Nebraska tornado have been the first great national disasters since the use of the automobile attained prominence. Besides actually affecting the industry through the submersion of factories making automobiles and accessories and by the great delay of freight passing through the Ohio and Indiana routes, interest has centered on the motor car as an instrument of rescue and a means of increasing the rapidity of repair work. It is still impossible to get reports from isolated districts but estimates have been made that the losses to individual factories are as high as* $100,000. *In Dayton the losses will come to many times this amount. As it is under martial law now reports from submerged districts are exceedingly difficult to obtain.*

THE big effects of the flood through Ohio and Indiana on the automobile industry are the delays in shipments and the shutting down of plants until repairs and railroads and factories are complete. The actual damage through contact with water is not so serious as the loss in time. Freight passing by way of Toledo has been held up indefinitely. It will probably be 3 weeks before traffic is straightened out.

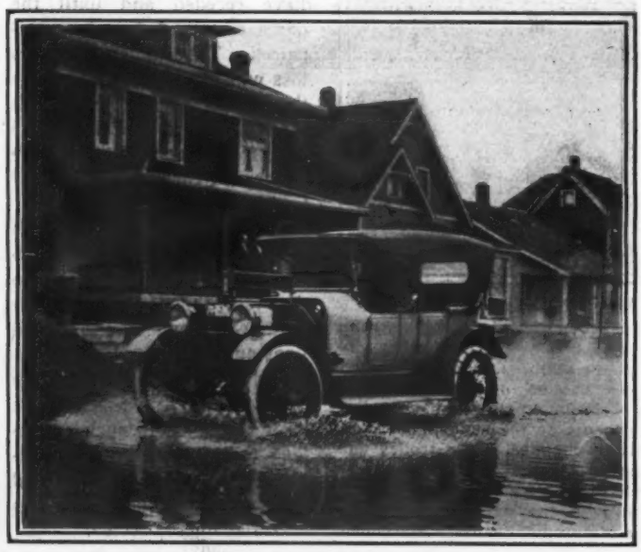
Two big automobile states, Indiana and Ohio, have suffered severely from the flood which is now beginning to recede. Dayton, O., the home of many factories connected directly to the automobile industry, has suffered most heavily from the devastating flow of water. The Dayton Electrical Laboratories Co. has been reported temporarily crippled. In Akron the Firestone rim factory is partially submerged and the Goodyear company has suffered damages. Several concerns of Dayton making products necessary to the equipment of cars made in other centers, such as Detroit and Indianapolis, have been compelled to stop work until the waters have receded and until the damage caused has been repaired. Thousands of dollars loss will have to be covered by the industry, not only through the actual damage done by the contact of the goods with the water, but through the loss of time on contracts, etc.

Many of the car makers have been compelled to reroute their shipments owing to the fact that washouts have occurred along the railroad lines and entire banks supporting railroad tracks have been carried away. Bridges have been weakened to such an extent that it has been considered unsafe by the railroad engineers to operate trains over the lines affected.

Typical Ohio street scene—The above illustration shows how the water reached far up into the residence section of Columbus, rendering the streets impassable except to automobiles and other vehicles which were capable of traveling through the submerged areas. Many people living in this section of the town are automobile owners who keep their cars in small garages at the back of the house. They were able to get downtown in their cars and to assist their neighbors in getting supplies. The trolley car lines running through this city and in Dayton and other places affected by the water were so crippled that they could not operate and as it was impossible to get through the streets by walking many who could not avail themselves of automobiles were marooned

In Fort Wayne an Ideal motor truck was used to pump water out of a flooded building

Truck transporting a relief boat in Toledo



Car on rescue work. Indianapolis car makers put all available cars at the disposal of the police

It has been exceedingly difficult to secure any definite reports from Ohio. This is especially true of Dayton. In the latter city alone the loss will amount to many hundred thousand dollars. Since martial law has been declared through Dayton and the work of the rescuers engages the attention of every available citizen, no accurate accounts have been taken of detailed damages. The latest news from Dayton appears on page 752.

Unconfirmed reports have reached Toledo regarding Dayton. It is stated that the Maxwell concern was the most heavily hit of the automobile manufacturers. The Maxwell concern is fortunate in having recently made heavy shipments to dealers throughout the country and has therefore not been crippled as badly as would have been the case were this stock all left on hand. Production will be only slightly interrupted in the Maxwell plant. The Speedwell plant, contrary to reports was unharmed.

In Columbus, O., the plant which suffered the most is that of the Columbus Buggy Co., which has been in financial difficulties of late, and is now in the hands of receivers. The buildings connected with this plant are submerged to a depth of 10 feet and the water is receding but slowly. It is fortunate with this plant that the water did not attain a slightly greater depth as the battery and electrical departments would have been flooded and the resulting loss would have been much higher. The Republic Rubber plant, Youngstown, O., was not affected.

The John W. Brown Co., maker of automobile lamps, was another concern to suffer enormous losses. This company has an order on hand for 75,000 lamps for the Ford company.

Slight damage was sustained at the Garford plant, Elyria, O.

While Toledo itself escaped with comparatively small damage, many interests in neighboring towns in which Toledo capital is interested have been hit heavily. Perhaps the greatest instance of this is that of the Turnbull Wagon Works Co., at Defiance, O. This concern manufactures automobile wheels. The damage due to flooding amounted to about $75,000.

One of the biggest factors in the damage done to Toledo dealers is the fact that very few sales may be expected for some time. It is probable that business will be dull in the selling line with Ohio retail concerns dealing in cars and accessories. The value of the automobile in a disaster of this kind have been effectually demonstrated in Toledo. The repair work on the bridges and culverts affected or suspected of weakness has been rushed through quickly, owing to the rapidity with which workmen and supplies have been carried to the critical points. Other benefits have been reaped from the automobile trade in a charitable way. An instance of this is the automobile parade to be given in Toledo and performances in seven theaters made up

of amateur actors who are employees of automobile concerns.

Indiana did not suffer as heavily as did Ohio, but the damage throughout this state is severe, nevertheless. Directly affected by the flood were twenty-six car manufacturers, 413 dealers and garages and eight branch salesrooms. In Ohio there are 719 dealers and garages, forty-two car manufacturers and twenty-four salesrooms affected. In Indianapolis three big plants, the Marion, Pathfinder and Marmon, had their lower floors submerged. Other concerns whose lower floors were covered by several feet of water are the H. J. Martin Forging Co., R. J. Irvin & Co., and the Showalter Mfg. Co. None of the garages or salesrooms were affected. The automobile show under the auspices of the Indianapolis Automobile Trade Association was abruptly stopped on Tuesday when 10 feet of water cut off communication. Sunday the show was reopened for the benefit of the flood victims. The factory of the National Motor Vehicle Co., which is on the north side of the city was not damaged in any way by the flood, which will not affect production in any way.

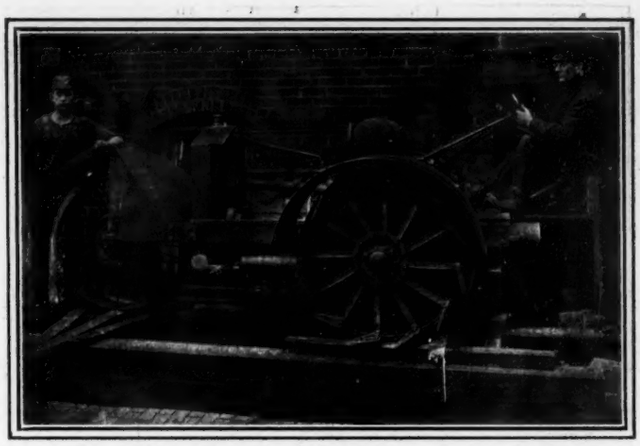
In Indianapolis the water did not reach the center of the town. The salesrooms did not suffer to the extent as did the shops through the factory district of the town. The principal cause of loss in this city is not the direct contact with the water, but the fact that railroad communcation has been paralyzed. The town is short of coal and many of the plants will have to shut down because it is impossible to keep the power houses going. The town coal supply has been reserved for use in residences. It is stated that freight communication between Indianapolis and Connersville will be resumed in the course of a week, and according to reports from the inundated districts it is said that the railroads are offering $1 an hour for labor in rushing the repair work. Connersville has not been affected by the water and all reports to the effect that actual damage has been done have been denied.

The Remy Electric Co., Anderson, Ind., was not seriously affected by the flood. The only damage being loss of time due to the disablement of the municipal power plant. An improvised power plant supplied the deficiency. The Nyberg plant was unscathed.

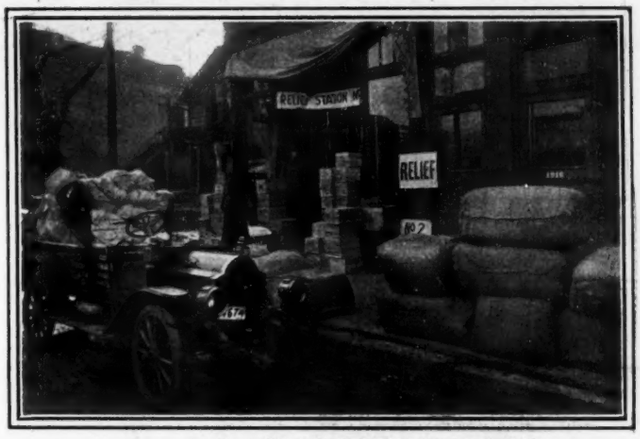
The waters did not reach the plant of the Warner Gear Co., Muncie, Ind., but the company was obliged to shut down because of lack of city water and power. It is now running shorthanded on account of non-delivery of necessary material, but expects to be running on schedule in a few days.

The Great Western plant at Peru escaped serious damage and the company is already commencing shipments. A small force started work Sunday which will be increased as soon as the men can get back. The Brown Commercial Car Co.'s plant was flooded but no great damage done. The Maxwell plant at Newcastle, Ind., was not damaged at all as was originally reported.

Kokomo, Ind., was cut off from all neighboring towns as far as railroad service is concerned for 2 days. The telegraph and telephone service was also so crippled during the first 2 or 3 days of the high water that they were absolutely unable to cope

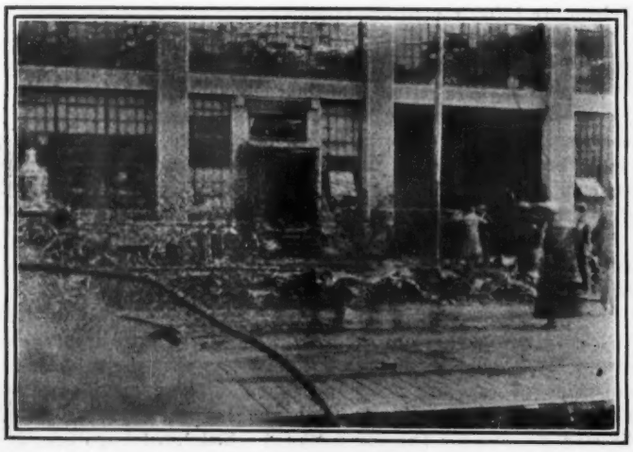


A Lambert tractor drying newspaper building cellar



Omaha cars relieved the situation by hard work

Orr company's store and Omaha electric garage after storm

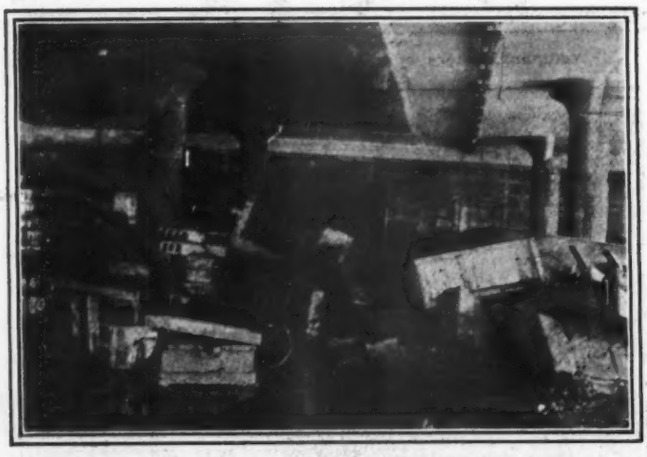


A fire engine pumped water out of the Delco plant

A car in Dayton getting ready for relief work

The flood gave rise to many adventures and human sympathy was evidenced splendidly in many ways

Speedwell car which did relief work in Dayton at the time of the flood. The car was specially marked so as to insure its unhindered passage



Cellar of Delco plant after the flood which disarranged the parts and material stored therein. The water almost reached to the ceiling

Henderson car carrying boat and policeman to flooded district

with the situation. This cutting off of the city gave rise to many rumors which have since been proven unfounded. The biggest damage to the city was caused by the destruction of about 150 homes which have been so badly damaged as to require extensive repairs. The Apperson Automobile Co. was forced to suspend operations for a few days when its plant was flooded.

Fort Wayne, Ind., has one automobile factory, that of the Ideal Auto Co. This plant stood for a week under 4 feet of water. During this time about thirty complete machines on the lower floor were submerged. A great many small parts in the stockroom were also damaged as a result of contact with the water. Those parts which were not actually destroyed by the water are covered with a coating of slime which will require considerable labor to remove. The estimated damage to the Ideal plant is about $3,000.

South Bend and Mishawaka, two Indiana towns which are noted as automobile centers, the first as the home of the Studebaker Corp. and the second as the site of the Amplex factory, were fortunate enough to escape damage from the floods. Neither of these concerns expects the damage sustained through the inundated districts to affect its output or sales in any manner worthy of comment.

Influence of Disaster at Detroit

While it is still too early to make any specific statements as to the probable loss which the automobile industry in Detroit will suffer as the result of the floods, it is very evident that the vengeance of the elements on the stricken district will be felt to some extent at least, although the majority of the makers are very sanguine.

The suspension of railroad service south from Toledo offers a serious consideration at present, as it will serve to hold up shipments and in some cases will necessitate storing a large number of machines at the factories until traffic is resumed. In other cases the car lots which were to have been shipped through Toledo are being routed elsewhere.

The Ford company so far has not been crippled to any extent by the disaster, according to F. H. Diehl, purchasing agent. The recent tire workers' strike was taken advantage of for stocking up on pneumatics, the Ford supply of these now being very large, sometimes as many as fifteen to eighteen carloads a day having been shipped in at strike time. As for coal, the company has enough for two months of maximum running, while the supply of steel products, frames and so on is correspondingly large.

The Ford company buys from many divergent sources to protect itself against just such tie-ups as these great floods. However, no word has been received from many of the concerns the company buys from in the stricken territory.

N. A. Hawkins, general sales manager of the Ford company, echoes Mr. Diehl's sanguine views, and says that the sales and shipments of cars are not affected any. Those consignments which were to have gone to Ohio and Indiana have been redirected elsewhere. The contemplated schedule of 1,000 cars a

A portable garage and car in Omaha after the tornado

day will not be curtailed in the least. Of course, those shipments already in the Ohio region are not yet heard from, but the loss is up to the railroads, says Mr. Hawkins. The Ford concern could sell its entire output in the East and West and forget about the rest of the country, according to its sales manager.

C. C. Winningham, sales manager of the Hudson Motor Car Co., states that the Dayton Hudson dealer had about six machines, but no word has been received as to their fate. The Hudson company will probably loose some seventy-five sales of cars as a result of the floods. Two carloads of Hudson cars arrived in Dayton the day previous to the outbreak and no trace of them has yet been obtained.

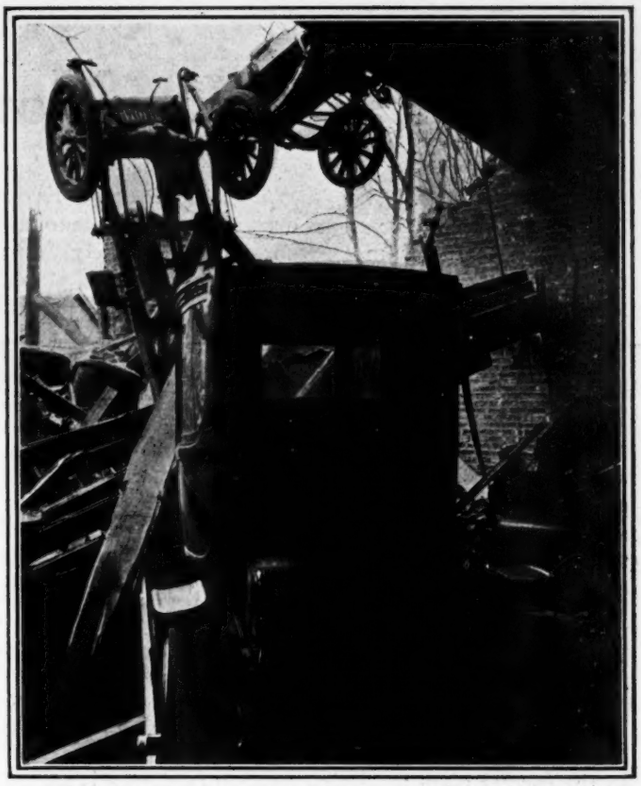
Lee Counselman, Chalmers company, states that he cannot tell how his company is affected until it gets word through. Several sources of its supply are located at Dayton and many forgings are obtained from Fremont, O. Since no mail or other communication has been received, it is, of course, impossible to say what business was on the way.

D. T. Hastings, general manager of the Hupp Motor Car Co., is not so hopeful. He states that his company will be seriously affected by the floods, not only due to the holding up of supplies, but because outgoing shipments for the Southeast which were to have gone through Toledo are held up. The Hupp company has sent out three men to trace shipments. These men are looking up cars shipped from the factory and supplies in transit.

Kentucky automobile factories are not situated near enough to the banks of the Ohio River to feel the effects of the high water. Louisville is about the most important town located on the Kentucky side of the river and in that city none of the garages or salesrooms were damaged.

Tornado Cost Car Owners $300,000

Coming as a forerunner of the heavy floods, the tornado which swept through Nebraska must be connected with it in the minds of those who stop to consider this chain of disasters. A path was literally torn through the city of Omaha, leaving behind it 114 people dead, 1,169 homes wrecked, 6,000 of the residents homeless, and with a loss of $10,000,000 to homes, merchandise and personal property. It did not take in any of the business section of the city, being almost entirely confined to the residential part and but comparatively small damage was done to the automobile interests. The Electric Garage, local dealer for the Baker electric, R. & L. electric and Flanders electric, and the Orr Sales Co., agent for the Packard, both in the same building at Fortieth and Farnum streets, were the only automobile firms to loose anything by the big storm. It is estimated that with the building and the cars that were in the garage at the time, all of which were completely destroyed, the damage to these two firms will not exceed $150,000. Many private garages and cars were destroyed, but at this time no correct estimate can be made. It is safe, however, to say that, all told, automobile owners will have lost $300,000.



Cars and chassis in the debris of an Omaha garage after the tornado had passed (C. N. E.)

In Omaha an automobile was carried 500 feet away from its garage and deposited in a cellar

Omaha tornado capsized a big car (C. N. E.)

Dayton Plants Not Seriously Damaged

DAYTON, O., April 2, *Special Telegram.*—Early reports of the flood declared that the automobile industry in Dayton suffered severely from the inundation but a personal inspection of the plants affected by a representative of THE AUTOMOBILE proves this report to be much exaggerated. The Maxwell suffered the greatest loss in that its three buildings had their lower floors washed out. The two buildings at the Big Four tracks had the offices on the lower floor flooded, together with the finished stock room. There were few cars in the latter room and hence the loss was not very great. The plant on the north side had the lower floor damaged also, but not to an extent great enough to put the plant out of business for more than 2 days. A sign on the Maxwell buildings reads, "Men report to work Monday, March 31.

The plants next hardest hit are those of the Dayton Engineering Laboratories Co. and the Apple Electric Co. The lower floor of both these buildings was flooded almost to the ceiling, but the damage done was more in the nature of damage to the building than to material. In the former plant the Delco starting appliance is manufactured. The lower floor contained the shipping room, offices and part of the assembly department. Few of the big windows were broken and hence little material floated away. The same may be said of the plant of the Apple Electric Co., which is not far from the Delco plant.

Although the flooded area covered most of the city of Dayton, by a strange combination of circumstances the Speedwell Motor Car Co.'s plant was not affected. The water was within two squares of the one-story Speedwell buildings, but did not make its way to the plant. It afforded a place of refuge for hundreds of Daytonians.

The Dayton Mfg. Co., which supplies lamps to a number of makers, suffered little damage. The only definite estimate of damage done was given by A. W. Apple of the Apple Top Co., who gave $2,000 as the extent of the flood's pillage.

Together with manufacturing plants comes the motor car agencies, most of which were situated on Third street, the most affected portion of the city. Here the loss is great for not only were the buildings wiped out, but show cars and stock together with the office records went also.

It is expected that work in the various automobile shops and those connected with the industry will resume operations in a few days. The work of getting the buildings in shape is the least thought of. Work of this sort is going on rapidly. The chief cause for worry lies in the fact that Dayton is without power. However, at the Speedwell plant it is hoped that the gas engines on hand will be able to supply enough power to keep the plant running until the central station is in good shape. The other factories will obtain power from the plant of the National Cash Register Co. and a number of other unaffected shops.

Men are being rushed to Dayton from every part of the United States, so that the work of cleaning up the city will not fall upon the shoulders of those men living in Dayton, who are anxious to get back to work. The only thing that will hamper the industry at Dayton, is the present crippled shipping facilities. At this time the Pennsylvania is the only road operating. All the bridges are down except one concrete affair, so that it remains to be patient until these bridges are reconstructed before any factories supplies may be had or before any shipping can be done.

The Delco plant was in full operation before the flood and the Speedwell and other plants had a great number of orders on hand. Representatives of the factories said that the loss due to non-shipment of cars and parts, would be practically nil.

Much credit, indeed, is due the men in Dayton who are connected with the motor car industry. When the officials of the Speedwell plant heard of the flood they immediately put into service thirty-five finished cars. All that could be gotten from the Stoddard-Dayton plant were sent hurriedly to the stricken people. Even Springfield responded to the call. The work done by the six motor trucks sent by the Kelly-Springfield Company was nothing short of marvelous. These trucks reached Dayton under their own power in time to be of great assistance in carrying people from flooded hospitals to places of safety. Without motor cars the city of Dayton would be practically helpless, for the great majority of the horses were drowned. The 250 cars doing rescue work bore signs reading, "Pass this relief car." As much as 80 miles per day was traversed by each of these cars.

In all, about 200 motor cars were carried away by the flood, the estimated loss to owners being close to a quarter million dollars.

Ohio Loses $1,000,000 in Bridges

COLUMBUS, O., March 31—At the request of James Marker, state highway commissioner, Walter Braun, engineer of Franklin county, has furnished the state a list of bridges lost by the county with an estimate of how much it will take to replace or repair the same. The approximate loss of the county will aggregate $1,000,000 and the legislature expects to pass a law appropriating money for the reconstruction of bridges lost in the flood.

The bridges over the Olentangy destroyed by the flood and the approximate replacement values are: Wilson Bridge, $15,000; Worthington, $30,000; Weisheimer, $20,000; Dodridge, $2,000; Lane avenue, $20,000; King avenue, $20,000; Fifth avenue, $2,000, and waterworks, $5,000.

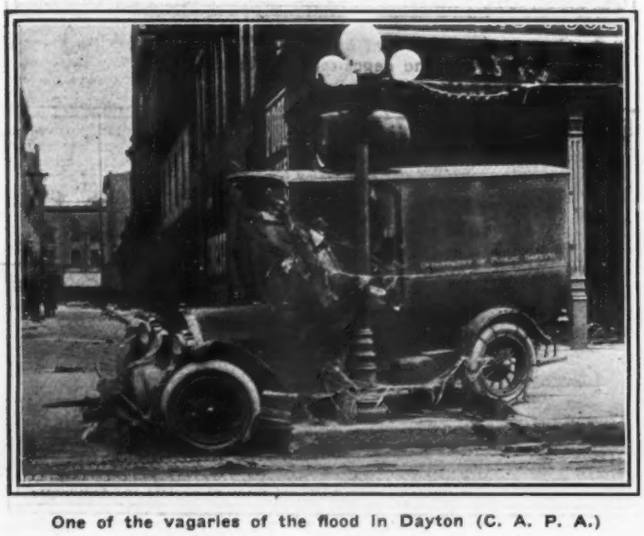
Those over the Scioto River and their building costs were: Williams, $50,000; Grand View avenue, $25,000; Sandusky street, $15,000; Broad street, $200,000; Mound street, $75,000; Greenlawn avenue, $2,000; Frank road, $30,000; Clickenger road, $30,000, and Shadeville, $15,000.

Those over Alum Creek were: Eberly road, $2,500; Matheny, $2,000; Fark Mills, $5,000; Westerville road, $5,000, and Westerville, $2,000.

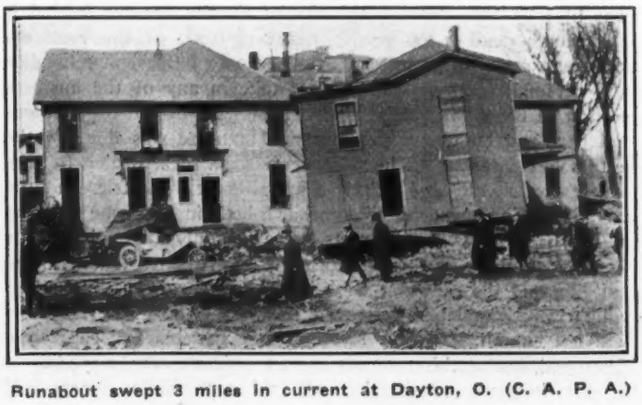
Those over Big Darby Creek: Converse, $5,000; High, $3,000; National Road, $12,000; Georgesville, $5,000; Chenoweth Mills, $2,000; McKinley, $3,000, and Harrisburg, $25,000.

Those over Little Walnut: Winchester, $1,000; Burgstresser, $4,000; Harris, $2,000; Seymour, $2,000; Corbett, $4,000 and Hopewell, $10,000.

The total expense of replacing and repairing these bridges aggregate in sum total, $787,500, but with the $50,000 loss to the city through the washing away of the State street bridge and the $150,000 loss through the Town street bridge, this total is increased to $987,500.



One of the vagaries of the flood in Dayton (C. A. P. A.)



Runabout swept 3 miles in current at Dayton, O. (C. A. P. A.)

February Exports Beat 1912 By 68 Cars

WASHINGTON, D. C., April 1—More automobiles were exported from America during February, 1913, than in February, 1912. Last year the number was 2,403, this year it was 2,471, an increase of sixty-eight machines. Last year the 2,403 machines were valued at $2,274,489 and this year the valuation was $2,630,097.

During the 8 months ended February last the number of cars exported was 14,488 valued at $14,852,628, as against 12,347 cars valued at $12,064,383 shipped abroad during the same period of 1912. Exports of parts, not inclinding engines and tires, increased in value from $345,965 in February, 1912, to $444,728 in February last and from $2,426,264 to $2,983,336 during the 8-month period.

Imports of cars decreased in number from seventy-three, valued at $166,048, in February, 1912, to thirty-three, valued at $82,119, in February last and from 717, valued at $1,575,376, to 569, valued at $1,329,345 during the 8-month period.

Exports of automobile engines increased from 954 valued at $113,871, in February, 1912, to 1,428, valued at $243,995, in February last and from 3,484, valued at $417,308, to 6,964, valued at $1,089,907, during the 8-month period.

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Finnegan to Continue Thomas Name

BUFFALO, N. Y., April 1—*Special Telegram*—C. A. Finnegan, who recently purchased the entire stock and equipment of the E. R. Thomas Motor Car Co., of this city, has announced his intention of continuing the manufacture and sale of chassis for fire-department vehicles as well as the making of repairs on Thomas cars. This work will be carried on under the name of the E. R. Thomas Motor Car Co. at the plant on Niagara street, in this city. Mr. Finnegan is undecided at the present time as to whether or not he will continue building passenger cars.

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50,000,000 Packages in Parcel Post

WASHINGTON, D. C., March 31—Reports submitted to Postmaster General Burleson show that approximately 50,000,000 parcel post packages were handled throughout the postal service during February, which is about 10,000,000 in excess of the number handled during the previous month. These figures are based on the amount of business done at the fifty largest post offices where about one-half of the postal business of the United States is handled. When it is considered that there were 3 more days in January than in February these figures are all the more remarkable. Actual figures for the calendar month, regardless of the number of days, show that the parcel post business at the fifty largest offices increased 25.98 per cent. during February over the previous month.

As in January Chicago exceeds all other cities in the number of parcels handled with a total of 5,167,540, and following in order are New York with 4,102,010; Boston, 1,326,228; Cleveland, 1,226,025; St. Louis, 1,069,305; Philadelphia, 1,046,045; Jersey City, 916,180; Brooklyn, 816,440; Detroit, 766,661, and Cincinnati, 569,285. Cleveland, which ranked sixth in the amount of business done during the month of January, jumps ahead of both St. Louis and Philadelphia in the amount of business done during February, Philadelphia dropping to sixth place. Jersey City, which ranked twelfth in January, is now only about 100,000 behind Philadelphia.

The express companies may protest to the Interstate Commerce Commission on the ground that the parcels post system already threatens decrease in their revenues to the extent of $5,000,000 for the present year. It is said that the operation of the new system has cost these companies 22 to 25 per cent. of their total business in packages during the first 60 days of the year.

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Organize to Make Wire Wheels

COLUMBUS, O., March 31—The Frayer-Howard Co., of Columbus, O., has been organized by Lee Frayer, a well-known racing driver of Columbus, and H. S. Howard for the purpose of manufacturing wire wheels for all kinds of automobiles. Several cars in Columbus have been equipped with the wire wheels with good results. The Columbus concern is prepared to equip any car with wire wheels and the plan is to carry a fifth wheel with an inflated tire in order to avoid the delay and trouble in exchanging tires.

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The Last of the London Taxicab Strike

After 11 weeks of idleness the London taxicab drivers have resumed work. The proprietors have yielded, and the men are to receive gasoline at the old price of 16 cents per gallon. The offer made by the British Motor Cab Co. to supply the men with gasoline or an equivalent mixture at the rate of 21 cents per gallon with a guarantee of 23 miles to the gallon was rejected.

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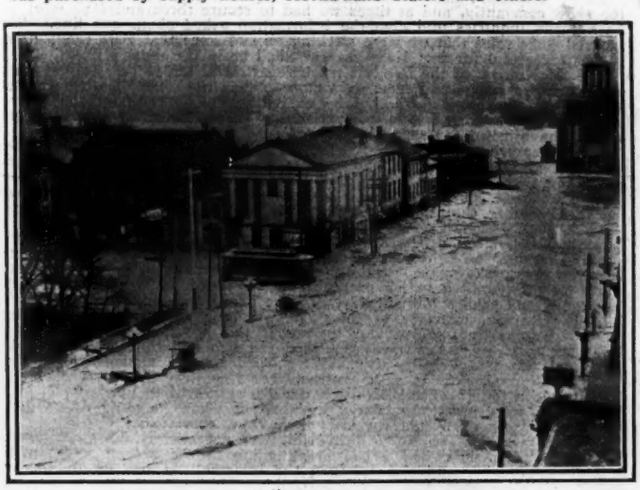
FLINT, MICH., April 1—The entire assets of the Randolph Motor Truck Co., Flint, Mich., bankrupt, were sold at auction on March 27 and 28, by order of the United States District Court for the Northern District of Michigan.

There were twelve purchasers in all, the principal buyer being the DeKalb Wagon Co., DeKalb, Ill., which purchased one-half of the assets, including truck parts, complete vehicles and other materials. This principal purchase also included two-thirds of the machinery. E. S. Hunt, manager of the Randolph concern, states that the DeKalb people intend to manufacture motor vehicles of the Randolph type under the trade name New Randolph. All of the DeKalb purchases will be moved to DeKalb, Ill., the present plant at Flint being abandoned, so far as the making of motor vehicles is concerned. The balance of the machinery, shop tools and parts was purchased by supply houses, second-hand dealers and others.

Wrecked fire department trucks, Columbus, O.



Cars in water rushing down Hight street, Hamilton, O. (C. N. E.)

Boston Favors Show

Lease for 1914 Exhibition Signed—Twenty-three Agree To Show—Rubber Strike Off

BOSTON, MASS., March 29—All doubts as to whether or not Boston would have a truck show next year was dispelled today when Manager Chester I. Campbell stated that he had already signed a lease for the building; and furthermore that 23 of the exhibitors this year had put in applications for space already, some of them for a greater area than they occupied this year. At a meeting of the Boston Commercial Vehicle Dealers' Association held yesterday, President J. S. Hathaway stated that plans had been made to open the truck show on Tuesday evening next year and finish it up on Saturday night instead of running it over into a second week with a Sunday intervening, as was done the past two years. It will be possible to open earlier because the owners of Mechanics' Building have arranged to build an additional runway on the rear of the building, that will be of steel and much wider than the present one. The old runway will be retained and the pleasure cars will be rushed out on one while the trucks are being received on the other and in this way an entire day at least will be saved. If it were possible to work on Sunday the show could open Monday night, but the 24 hours of the Sabbath are sacred here.

To get an expression of opinion from some of the big exhibitors the representative of THE AUTOMOBILE visited the spaces on the closing day of the show. He questioned the exhibitors as to whether the show had been successful enough to warrant their taking space next year in view of the fact that Chicago and New York had discarded truck shows. The sentiment in favor of exhibiting again was practically unanimous.

Views of the Boston Dealers

Norman Halliday, manager of the truck department for Alvin T. Fuller, Boston agent of the Packard, said: "We sold several trucks, but more than that, we got in touch with people that will keep our sales department busy for the next 4 months developing the business. From the Packard viewpoint, I consider the show a success."

The White was one of the biggest exhibitors, and J. S. Hathaway, Boston branch manager, said: "It was most successful from our sales standpoint. This was due to the fact that this was a real selling show and we had a variety somewhat larger than some of the other exhibitors. Next season, with the show held within a week, it will be much better. Walter White went back to the factory delighted with the results here."

Frank Crockett, truck manager of the Boston branch of the Locomobile, said: "In view of the fact that this was the first time we presented a complete truck the results were satisfactory. We had people come in and leave their names, requesting information relative to our product, so that we now have more than 60 people to work on. That represents many people whom we would have to search out and locate, and some of them we never would have found, perhaps. We shall exhibit again."

A. P. Underhill, the Knox representative, said: "We had eight men at the show constantly, and at times we had to secure three and four more to answer the inquiries and give the information asked about our line. We secured some sales that we were working on and some that were really new. It was successful for us. Next year we shall be in the show."

J. S. McKinney, of the Peerless truck department, said: "We sold at least one truck every day, and some days more. They were not all sales that resulted from the show alone, but by exhibiting our product we could give purchasers a chance to make comparisons. This resulted favorably for us and we have asked for space next year."

J. W. Maguire, of the Pierce-Arrow, said: "Our worm-gear drive has been in operation long enough to give prospective customers some real statistics, and when they saw what we exhibited and it was of the tonnage capacity wanted we were able to close up some sales. People are not buying big trucks like other things, but comparatively speaking, it was a satisfactory show for us."

George M. Hudson, of the Alco, said: "We sold some trucks, but I believe that if the show were held earlier in the year, say in January, right after the New York show, the results would be better. Perhaps a fall show might be considered a better proposition. However, we are satisfied with the results and shall exhibit next year. The new plan will be a great help."

L. E. Harmon, manager of the Myer Abrams Company, handling the Lauth Juergens line, said: "Our answer is that we have not only asked for space next year, but have requested the two additional spaces beside us to get almost an entire aisle. W. S. Diller, sales manager from the factory, left us last night with contracts carrying deposits for trucks, the deposits alone totaling $10,500. Eight trucks were sold to new people, and four others were practically closed with, all of whom came to us. Other sales were made to people we had worked up previously."

P. S. Altman, of the Kelly-Springfield, was not one of the enthusiasts. He said: "The show had a bad break going into a second week, with Sunday intervening and this lessened the interest. It ties up too many trucks at a time when they might be sold."

E. A. Gilmore, who has the Federal and Standard said: "We found that the show was a success. If some of the others had advertised their product, or used their advertising along concerted lines I think they would have done better. This is no criticism of their efforts. But we found people locating us as a result of knowing that our firm was the same one that handled the Chalmers product. We sold several Federal trucks and a few Standards, the latter being new with us."

C. P. Rockwell, the Rambler branch manager, exhibiting the Jeffrey said: "I was surprised at the attention the Jeffrey attracted. It was inspected by lots of people and it received favorable comment on its construction. We expect to sell a lot of them."

The Mercury from Chicago was so well thought of that agencies were closed up the first day. W. A. Zimmerman from the factory said: "We got in touch with a number of individuals and now we are working on some of the corporations. We can trace a number of our sales this year to the fact that we exhibited a year ago, and so we shall be here again, but with much more room. This was a very successful show."

L. B. Johns, of the G. M. C., was satisfied with the show from his point of view: "Producing both electrics and gasoline vehicles we are in a position to give a purchaser what he wants without having to knock another product, which sometimes happens in the trade. We had no trouble in interesting a number of people."

Fred H. Lucas, of the Pope Hartford, said: "Many people do not realize that within a few miles of Boston there are fifty-four cities and towns with a population running above 10,000 people; that good roads connect all these places; that the per capita wealth is greater in this section than elsewhere, and that ours is a manufacturing community built up by natural water power, so that the factories are not going to move away and leave behind such valuable assets for competitors. So in the life of trade they need trucks and it is up to us dealers to sell them. We have no complaint to make about our success."

These comments tell the story of the future of the truck show in Boston. And being the only one of National importance it will attract more exhibitors undoubtedly.

Rubber Strike Declared Off

AKRON, O., March 30—*Special Telegram*—At a meeting of Industrial Workers of the World leaders here tonight attended by 200, the strike in the rubber factories was declared off. No concessions were gained by the strikers and the I. W. W.

Automobile Securities Quotations

As a consequence of the disaster in Ohio and Indiana, a number of securities declined during the week, so that the general tone of the market was not clear. Conditions in the tire industry are normal, so far as the strike is concerned, but the flood naturally had some influence on this industry, too. Nevertheless, Firestone jumped 20 points, while Goodrich advanced but 1; Goodyear common dropped 25 and Swinehart 5 points. Rubber Goods Mfg. likewise fell 4. and Fisk 5. U. S. Rubber advanced slightly.

	1912 Bid	1912 Asked	1913 Bid	1913 Asked
Ajax-Grieb Rubber Co., com	..	..	150	165
Ajax-Grieb Rubber Co., pfd	..	..	95	100
Aluminum Castings, pfd	..	..	95	100
American Locomotive Co., com	38½	39½	37¾	38½
American Locomotive Co., pfd	108½	109½	105	106
Chalmers Motor Company, com	..	..	120	135
Chalmers Motor Company, pfd	..	..	100	102½
Consolidated Rubber Tire Co., com	11	18	15	20
Consolidated Rubber Tire Co., pfd	20	40	..	79
Firestone Tire & Rubber Co., com	234	236	285	295
Firestone Tire & Rubber Co., pfd	108	110	103	106
Fisk Rubber Co., com	..	..	..	..
Fisk Rubber Co., pfd	..	..	98	102
Garford Company, preferred	..	..	90	100
General Motors Company, com	30	30½	29¼	30½
General Motors Company, pfd	76	76½	76	77½
B. F. Goodrich Company, com	..	..	32½	33
B. F. Goodrich Company, pfd	..	..	94	95½
Goodyear Tire & Rubber Co., com	397	400	335	345
Goodyear Tire & Rubber Co., pfd	108	110	100	102
Hayes Manufacturing Company	..	..	..	90
International Motor Co., com	..	..	5	10
International Motor Co., pfd	..	..	35	45
Lozier Motor Company	..	..	..	25
Miller Rubber Company	..	..	178	182
Packard Motor Company	104	107	98	102
Peerless Motor Company	..	..	115	130
Pope Manufacturing Co., com	38	40	18	22
Pope Manufacturing Co., pfd	78	80	55	60
Reo Motor Truck Company	8	10	11½	12½
Reo Motor Car Company	23	25	20½	21½
Rubber Goods Mfg. Co., pfd	100	105	100	105
Studebaker Company, com	..	..	29¾	30
Studebaker Company, pfd	..	..	90	93
Swinehart Tire Company	..	..	90	100
U. S. Motor Co., com	..	..	..	8
U. S. Motor Co., 1st pfd	..	..	..	65
U. S. Motor Co., 2nd pfd	..	..	..	30
U. S. Rubber Co., com	53½	55	63¼	63¾
U. S. Rubber Co., 1st pfd	114	114½	106¾	107
White Company, preferred	..	..	100	108
Willys-Overland Co., com	..	..	57	64
Willys-Overland Co., pfd	..	..	90	98

retired defeated in every way. All Akron rubber factories are now in full operation. The stories sent out by I. W. W. correspondents that Akron's rubber factories had been wiped out by floods are without foundation. Only one factory suffered any damage by flood, and that was the Goodyear. The loss of this company will be trifling, the only damage done being the flooding of basement and drowning of fires in the engine rooms. The plant is now doing business as usual. No damage to accessory plants, garages, tire plants or salesrooms occurred, although water from the bursting of a dam at a reservoir south of the city swept through the canal leading down through the city.

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DETROIT, MICH., April 2—*Special Telegram*—The Kelsey Wheel Co. is now getting its factory in readiness for the production of wire wheels. The actual turning out of these types will not be possible before July 1, however. These wheels will be constructed under the concern's own designs and will be made to use Booth demountable rims exclusively.

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Triumvirate to Manage Olds

LANSING, MICH., April 1—A committee of three will in the future direct the affairs of the Olds Motor Works, due to the recent resignation of general manager O. C. Hutchinson. This advisory body will consist of Sales Manager J. V. Hall, Factory Manager E. B. Linden and Comptroller D. F. Edwards. The Olds plant is located in this city and is one of the General Motors group.

Market Changes of the Week

Few changes took place in last week's markets. In the metal market, steel was again the most important change. A rise of $1.18 occurred due to an increase of deliveries. Bessemer and open-hearth steels remained constant at $29.00 a ton. Electrolytic refined copper and Lake were held slightly higher. The market yesterday ruled firm on the basis of $.15 1-4 for electrolytic and $.15 1-4 for Lake, due to an increase of sales, and there is every indication that the consumption for March will be large. This, coupled with the very heavy exports and the better foreign markets, sounds good for continued firmness and perhaps higher prices. Lead remained unchanged at $4.35 per 100 pounds. There was an absence of new developments in the linseed oil situation, so far as the local market was concerned, prices ranging from $.47 to $.48. In the petroleum markets both the oils from the Kansas and Pennsylvania wells remained constant at $.88 and $2.50 respectively. Lard oil rose $.01 on Thursday, closing at $.94.

Material	Wed.	Thurs.	Fri.	Sat.	Mon.	Tues.	Week's Change
Antimony, lb....	.07⅝	.07⅝	.07⅝	.07⅝	.07⅝	.07⅝	.....
Beams & Channels, per 100 lbs.....	1.61	1.61	1.61	1.61	1.61	1.61	.....
Bessemer Steel, ton.....	29.00	29.00	29.00	29.00	29.00	29.00	.....
Copper, Elec., lb..	.14¾	.15	.15	.15	.15⅛	.15¼	+ .00½
Copper, Lake, lb..	.14⅞	.15	.15	.15	.15⅛	.15¼	+ .00⅜
Cottonseed Oil, bbl.	6.47	6.50	6.55	6.60	6.70	6.73	+ .26
Cyanide Potash, lb.	.19	.19	.19	.19	.19	.19	.....
Fish Oil, Menhaden, Brown..	.33	.33	.33	.33	.33	.33	.....
Gasoline, Auto, 200 gals.....	.22¼	.22¼	.22¼	.22¼	.22¼	.22¼	.....
Lard Oil, prime...	.93	.94	.94	.94	.94	.94	+ .01
Lead, 100 lbs....	4.35	4.35	4.35	4.35	4.35	4.35	.....
Linseed Oil.....	.47	.47	.47	.47	.47	.47	.....
Open-Hearth Steel, ton	29.00	29.00	29.00	29.00	29.00	29.00	.....
Petroleum, bbl.. Kansas crude...	.88	.88	.88	.88	.88	.88	.....
Petroleum, bbl., Pa., crude.....	2.50	2.50	2.50	2.50	2.50	2.50	.....
Rapeseed Oil, refined	.68	.68	.68	.68	.68	.68	.....
Silk, raw Italy...	....	4.30	....	....	4.30	....	.....
Silk, raw Japan...	....	3.67½	....	....	3.70	....	+ .02½
Sulphuric Acid, 60 Baumé	.90	.90	.90	.90	.90	.90	.....
Tin, 100 lb.....47.00	48.00	47.15	47.15	48.00	48.18	+1.18	
Tire Scrap.....	.09⅞	.09⅞	.09⅞	.09⅞	.09⅞	.09⅞	.....

Goodrich Cuts Prices

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Cheap Rubber and Automatic Production Means Are Reasons —Other Companies May Follow

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NEW YORK CITY, April 1—More or less consternation was precipitated in tire circles throughout the country when the Goodrich-Diamond organization announced a cut of approximately 5 per cent. on casings and inner tubes for the entire country. This cut to the consumer is best indicated on a 34 by 4-inch Goodrich tire which heretofore has listed to the consumer at $31.80, but under the new list will retail at $29.80.

Already several of the other companies have met this reduction. No official statement has been issued by the United States Tire Co., but several of its metropolitan dealers have been informed that they have met the cut, so that with this company the dealers' list in force until April 1 now becomes the list price to the consumer.

The Goodyear company has announced that it has also revised its prices to meet the new schedule.

No official announcement has been made by the Fisk company further than that a revision of its prices is promised.

No statements have been issued by the Firestone, Michelin, Republic, Ajax, and other concerns, although many of the dealers are of the opinion that practically all of the companies will revise their prices to meet the new schedule set by the Diamond-Goodrich organization. Where cuts have been made they have taken effect April 1.

The Kelly-Springfield Tire Co. will maintain its old price schedule.

The Michelin Tire Co. has not decided as yet what action it will take with respect to the price question, as Mr. Michelin, the head of the firm, is abroad.

The Empire Tire Co. on April 1 made a 5 per cent. reduction in the prices of its standard tubes and its round casings while the Red and Peerless tubes as well as the gray non-skid and red casings remain at their old prices. The Pennsylvania Rubber Co. has so far made no change in price and no definite plans have been formulated.

It is difficult to discover just why this price reduction has occurred. Several reasons are advanced. One is the cheap price of rubber, which is now quoted at 88 cents. Another reason is the more general use of automatic machines for manufacturing tire casings, whereby all of the fabric is laid and stretched by machinery. The Goodrich-Diamond Company has had one complete plant equipped with such machinery in operation for several months. It is stated in tire circles that a reduction in cost of manufacture of approximately 25 cents per casing is obtained by the use of these machines.

The new scale of prices will not affect the tire dealer, who, in many cases will receive standard commissions, which, to the preferred dealer, are 10 per cent. plus 7 1-2 per cent. with an additional 5 per cent. for cash. The regular dealer will continue to receive his 10 per cent. with an additional 5 per cent. for cash.

Size	Smooth	Bailey	Master	Tubes
30 x 2.5	$10.35	$11.10	.....	$2.45
30 x 3	12.25	13.35	.....	2.90
32 x 3	13.10	14.20	.....	3.10
34 x 3	13.85	15.05	.....	3.30
36 x 3	14.75	16.00	.....	3.45
32 x 4	27.85	29.95	$33.00	5.30
34 x 4	29.80	31.80	35.00	5.65
34 x 4.5	37.75	40.30	44.35	7.00
34 x 5	46.50	49.65	54.60	8.20
35 x 4	30.75	32.80	36.10	5.75
35 x 4.5	38.98	41.45	45.60	7.15
35 x 5	47.90	51.05	56.10	8.45
36 x 4	31.75	33.85	37.20	5.95
36 x 4.5	40.05	42.55	46.85	7.35
36 x 5	49.20	52.35	57.55	8.60
36 x 5.5	57.40	61.20	67.30	9.80

Maxwell Sells Factories Not To Be Operated

Five Plants Being Disposed of—Ford Enjoins International League—Argyll Wins From Knight

DETROIT, MICH., April 1—Walter E. Flanders, president and general manager of the Maxwell Motor Co., has made it definitely known to the trade that the Maxwell company does not intend to operate all of the eleven plants which were acquired by the purchase of the United States Motor Co.'s assets. The factories total 2,684,648 square feet of floor space and consist of the following: Flanders Motor Co., Brush Runabout Co., Alden-Sampson Co., Briscoe Mfg. Co., all of Detroit; the Providence Engineering Works, Providence, R. I.; the Maxwell-Briscoe Co., at Tarrytown, N. Y., and at Auburn, R. I.; the Briscoe Mfg. Co., Newark, N. J.; the two Stoddard-Dayton Co. factories at Dayton, O.; the Courier Motor Co., also at Dayton, O.; and the Columbia Motor Co., Hartford, Conn.

The Providence plant has been sold, while the original Maxwell plants at Tarrytown, N. Y., and Auburn, R. I., the Newark Briscoe factory and the Courier are also to be disposed of, according to the present plan. These are in high-priced land districts and this would make too high the purchases of land required for necessary factory extensions. Further, they are deemed too far from headquarters, and workmen's accommodations are inadequate.

One model only will be made in each of the plants which will be retained. In the former Flanders factory, the six-cylinder Maxwell model will be constructed exclusively, under the designation 50-6. The plants at Dayton will be devoted to the making of the larger four-cylinder type, model 35. Reorganization was progressing rapidly at these Dayton plants when the flood disasters swooped down upon the city, and they will of course be handicapped for the present. It is next to impossible to get any definite word yet as to how they fared. At the Brush and Sampson establishments the new four-cylinder low-priced model 25 will be made.

Statement on Flanders Mfg. Co.

DETROIT, MICH., April 1—The Detroit Trust Co., receiver for the Flanders Mfg. Co., Pontiac and Chelsea, has issued a statement showing the progress made to date in winding up the affairs of the concern. The statement says that it is practically impossible to estimate at this time the amount which may be realized for creditors and stockholders, although so far $246,700 has been liberated.

Appraisal of the properties at Pontiac and Chelsea shows that the assets at Pontiac amount to $660,914 and Chelsea, $586,182. Preferred creditors received $16,700 so far, leaving $230,000, which will be paid this month to creditors whose claims have been allowed. The period fixed by the court for filing sworn statements of claims terminated March 20, and on that date such claims aggregated $1,033,265.58. This total was made up by the claims of $692 creditors and there are 257 more whose charges amounted to about $15,000 and who filed no proof of what was due them. The liabilities on March 20 amounted to $936,708.17.

For some time after the court appointed a receiver several parts of the two plants were continued in operation, but this activity has stopped. The Flanders Mfg. Co. has no connection with the Flanders Motor Car Co., recently absorbed by the Maxwell Motor Co., Inc.

Ford Enjoins International League

BUFFALO, N. Y., March 31—In United States District Court last week Judge Hazel issued a preliminary injunction restraining the International Automobile League of Buffalo from advertising or offering for sale automobiles made by the Ford Motor Co., of Detroit, Mich. In the original bill of complaint filed from the Detroit manufacturers it was alleged that the International Automobile League had offered and advertised Ford cars at less than the prices charged by the factory for those cars. Losses estimated at $100,000 are alleged to have been sustained by the plaintiff motor car makers The Detroit company claims the local concern sought members at $10 a head claiming to be able to secure Ford cars at a discount. Other defendants in the action are John H. Tranter, Alfred C. Bidwell, William Preiss and John C. Hurley, all of Buffalo.

KINGSTON, N. Y., March 31—A. B. Cordner has been elected president of the Vaughan Motor Car Co., which has been organized to continue in this city the manufacture of the automobile designed by Guy Vaughan. F. E. Moskovics is vice-president and general manager; E. S. Partridge, vice-president and sales manager, and H. W. Johns, secretary and treasurer. The Vaughan car is to be a moderate-priced six-cylinder when it reappears on the market.

Evans Company to Build Trucks

PITTSBURGH, PA., March 31—The Evans Motor Car Co. took out its charter yesterday with a capital stock of $50,000. The incorporators are Everett Philpot, George Anthony, C. C. Woodcock, Howell Brandon, R. H. Evans and A. P. Foster. Mr. Evans stated that $40,000 of the amount had already been subscribed. The company expects to increase the capital stock to $200,000, according to Mr. Evans. The stock will not be offered to the public for sale.

Rochester-Mais Co. to Build Trucks

ROCHESTER, IND., March 31—A company to be known as the Rochester-Mais Commercial Car Co. has been organized for the purpose of building 1,500 and 2,500-pound trucks in this city and plans are being made for a factory building. The directors of the company are: A. C. Davisson, J. M. Ott, R. P. True, Earl Miller and J. M. Mais. All cars built will be of the internal-gear type. The cars will be designed by John A. Mais, who is a younger brother of A. F. Mais, formerly of the Mais Motor Truck Co. and now with the Studebaker Corp.

Argyll Wins Non-Poppet Suit

LONDON, ENG., March 24—The decision in the Knight-Argyll case, in which the American inventor, Charles Y. Knight, sued the Scotch concern for infringement of engine patents, has been handed down and is against Knight & Kilbourne. The case will be carried up to the House of Lords, where the Americans anticipate a more favorable decision, inasmuch as in similar cases in other countries they have been successful in the higher courts.

A. A. A. Adopts Blue Books as Official

NEW YORK CITY, April 1—Arrangements were completed today whereby the American Automobile Association has entered into an arrangement extending over a period of years with The Automobile Blue Book Publishing Company, whereby the Blue Book Road Guides become the official touring books of the association. Under this arrangement the title of the books will be "The Official Automobile Blue Book."

For 1913 there are six volumes of these official road guides, with a possibility of a seventh being brought out later in the season. Volumes 1 and 4 will be on the market in a couple of

A. A. A. To Fight Increase in Registration Fees

weeks, and the remaining volumes 2 weeks later. All of the volumes contain many thousands of miles of new road guide information as compared with the 1912 volumes. In one volume alone over 20,000 miles of additional route information is incorporated.

All of the route information in these volumes is obtained by Blue Book cars which traverse the entire country and obtain first-handed the road information.

S. A. E. and N. A. A. M. on Gasoline

NEW YORK CITY, April 2—After doing some preliminary work in investigating the fuel situation the committee of the National Association of Automobile Manufacturers decided to turn over the technical work to a committee of experts from the Society of Automobile Engineers. The expenses of the investigation are to be covered by the N. A. A. M. and it is to follow along two lines. First, the broad commercial proposition of providing an ample supply of fuel at a fair price and second the technical aspect in getting definite information as to the best methods of handling the fuels now on the market and in the investigation of possible substitutes. The first part of the work will be carried on by the N. A. A. M. division of the committee composed of Al. Reeves, A. L. Pope and R. D. Chapin. The technical work will be done by C. P. Grimes, E. E. Sweet and N. B. Pope. The use of carbureting devices for low grade fuels will probably be made a special study by the technical committee.

NEW YORK CITY, April 2—The hearings of rim makers before the pleasure car wheel division of the standards committee of the Society of Automobile Engineers was continued today under the direction of Chairman Henry Souther, who conducted the first hearing in Cleveland, March 12. This committee is aiming at discovering how far the S. A. E. can go in the matter of standardizing quick detachable rims and also demountable rims for passenger cars.

There was a general feeling at today's hearing that lightness is one of the objects to be aimed at in rim construction to take Q. D. tires, and also where the demountable rim is featured. Practically all present agreed with the chairman in that automobile engineers were today demanding lightening of these parts, and further that the present universal rim to take a straight-side tire is 10 pounds more or less heavier than the clincher type of quick detachable rim. One of the questions discussed was: "Would it be possible to eliminate the straight-side tire, which would, of course, eliminate the necessity for the universal type of quick detachable rim?" This would be a difficult problem, as at present one-half the output of several tire factories consists of this type of tire. It was finally decided to submit the question to the Clincher Automobile Tire Manufacturers' Association, which association is composed of several of the tire makers. This organization will be asked to report at the earliest moment.

The possibilities of reducing weight in Q. D. rims was discussed under the head of using better materials for the locking rings, alloy steels being suggested instead of the present steel.

David Fergusson of the Pierce Company addressed a letter to the committee recommending that some standard for bursting pressure on locking rings be set by the association. He cited figures from tests he had made showing the different pressures at which these locking parts gave way. The rim makers agreed that there was little trouble from this score, and where such occurred it was often due to incorrect fastening or to too great pressure, which could be traced to the more general use of power pumps for tire inflation. No definite action was taken on the question.

The feeling was general among some of the automobile engineers that it would be better not to aim at combining the clincher type of quick detachable with the universal, because of the additional weight it calls for, the suggestion being that quick detachable rings be either of clincher design or a straight-edge type, but not a combination of the two.

Association To Urge Campaign Against Unjust Legislation — Favors Reduction of Fees to Actual Cost

NEW YORK CITY, April 1—The American Automobile Association went on record today as being unalterably opposed to any increase in state registrations of motor cars and that the fees be limited to the actual cost of registration. This action, taken at the regular monthly meeting of the executive board, sounds the campaign cry of the parent association and which will undoubtedly be taken up by the two-score or more state organizations affiliated with it. Today's action took the form of a resolution which will be forwarded to all of the state bodies, and a resolution that has been prompted by the various bills introduced in several States.

The board also accepted the proposals of Minneapolis and St. Paul for this year's national tour, which will be run from the Twin Cities to Glacier Park by a route that the Minnesota motorists are mapping out. A committee of seven was appointed to look into the work with Dr. C. E. Dutton, Minneapolis, chairman, and Asa Paine, of the same city, vice-chairman. The tour will undoubtedly take place in July. Three trophies will be contested for, the new National Trophy to the winning touring car, the Anderson trophy to the winning runabout and the Glidden trophy to the winning team representing a club or other organization.

N. A. A. M. to Fight Truck Measures

NEW YORK CITY, April 2.—The National Association of Automobile Manufacturers held its monthly meeting to-day, at which the executive committee accepted the resignations of its former members, Alfred Reeves and S. D. Waldon and elected J. N. Gunn and Alvin Macaulay in their places. Arthur Benjamin, of the American Locomotive Co., was elected a member in the place of Harry Houpt, whose position as general sales manager of the company he has assumed recently.

The executive board named a committee consisting of R. D. Chapin, W. A. Metzger and S. A. Miles to confer with the officers of the American Automobile Association and of the Pennsylvania Motor Federation with regard to the threatened legislation in Pennsylvania inimical to automobiles.

May 7 was fixed as the date of the next monthly meeting at which the final steps for the practical opening of the Automobile Chamber of Commerce, the recently announced combination of the N. A. A. M. and the Automobile Board of Trade, will be considered.

The members present at the meeting were: W. A. Metzger, J. T. Davis, Jr., Walter White, Charles Clifton, H. H. Joy, Hugh Chalmers, A. L. Pope, L. H. Kettridge, R. D. Chapin, W. C. Leland, G. W. Bennett and J. N. Gunn.

Bill for Motor Vehicle Commission

ALBANY, N. Y., April 1—Senator Loren H. White, chairman of Senate committee on internal affairs, has introduced a bill in the state legislature authorizing Governor Sulzer to appoint a commission of three members to consult with similar commissions from Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New Jersey, Pennsylvania, Delaware and Maryland with a view to uniform automobile laws defining motor vehicles, the use and speed of automobiles and uniform license and registration fees. The commissioners are to serve without pay, but get an appropriation of $3,000 to pay expenses.

NEW YORK CITY, April 1—The Motor Truck Club, of this city, is taking up with Police Commissioner Rhinelander Waldo the subject of the field of manufacturers' licenses in New York City. The club proposes to have a stop put to this molestation.

Metropolitan S. A. E. Hears Two Papers

Care and Maintenance of Storage Batteries and Light Weight Reciprocating Parts for Motors Furnish Material for Animated Discussion

NEW YORK CITY, March 28.—Two papers were discussed at an interesting session of the Metropolitan section of the Society of Automobile Engineers held here last night. The first was a paper by Charles Countcil Munson, Splitdorf Magneto Co., on Batteries, Their Care and Maintenance. The second paper was by Morris Machol, vice-president Hydraulic Truck Sales Co., on Light Weight Reciprocating. Parts for motors dealing chiefly with magnelium, a metal composed of aluminum and magnesium.

Chairman Anglada announced that the foreign engineers are expected to arrive in New York, Monday morning, May 26. They will make their headquarters at the Hotel McAlpin and will be entertained Monday and Tuesday by the Metropolitan Section of the S. A. E. A committee has been appointed as follows: Messrs. Kennedy, Chase, Brown, Dean, Dow, Swetland, Wilson, Pope, Slade, Anglada. They leave at 9:40 Wednesday a. m. by special train for the West. Their itinerary will include Pittsburgh, Indianapolis, Detroit, Cleveland, Buffalo, Hartford, New Haven, etc. It is expected that the Metropolitan S. A. E. members will aid in entertaining them Monday evening, and on Tuesday there will be an automobile tour around the city, to the Long Island Speedway, and to some industrial plants in the city.

Several Battery Men Present

The first paper, while given over in a large degree to an elementary study of the dry and storage battery, was sufficiently advanced and indicative of modern practice to provoke an interesting discussion among the five or six members of competing batteries concerns who were present. Taking up the definition of the electric terms employed in battery practice, the author of the paper passed rapidly on through the construction of the dry battery, outlining the customary method of employing a zinc cup which performs the double rôle of container and negative pole. Lining the zinc cup is a series of blotting paper layers and placed in the center of the zinc cup is an upright carbon forming the positive electrode. The electrolyte consists of manganese dioxide and sal ammoniac. The capacity of each of these dry cells is in the neighborhood of 1.25 volts and 35 amperes.

Turning to the storage battery, Mr. Munson stated that he wished to call attention to the fallacy of employing the hydraulic parallel for storage batteries. He said it is wrong to assume the battery to be equivalent to a tank on an elevation because its action is more in the nature of restorative rather than the refilling action called to mind by comparing it to a tank. The electric current is passed through the battery to restore it to its charged condition and not to fill the battery with that current.

There are two types of storage battery. The alkaline and the acid. The Edison is an example of the alkaline type. The other batteries upon the market are of the acid type. Touching on the early experiments, Mr. Munson briefly stated the experiences of Planté in 1859 and 1860 when he placed two lead plates in a sulphuric acid solution and passed a current through this rude cell by connecting the positive wire to one plate and the negative wire to the other. After numerous discharges a brown coating appeared on the positive plate and a gray coating on the negative, forming the familiar surfaces known to present batteries. Since that time we have considerably shortened the process of securing the brown and gray coatings. The coating in the positive plate is what is commonly known now as red lead and in the negative plate lead oxide.

Passing on through the actual construction work of the battery we come to the question of capacity. The capacity of a battery depends on the character, porosity and distribution of the plates, quality and quantity of the electrolyte and its arrangement governing its diffusion and its rate of discharge.

At the meeting last night the chief interest centered on the storage battery used for lighting and starting purposes. The demand of quick discharge made in the latter class of batteries has presented a problem so new to the battery manufacturer that he has not as yet found the solution of the problem. The rate of discharge depends upon the plate area subjected to the electrolyte. It is evident that in a given cell a greater area will be secured by the use of a large number of thin plates rather than a smaller number of thick plates. This is one of the chief features of the starting battery. As explained by Mr. Munson, a starting battery can be readily used for ignition and lighting purposes where the amperage is small and at the same time stand ready to give the quick discharge necessitated by the cranking motor. On the other hand, an ignition or lighting battery would not be suitable for starting purposes. owing to the fact that insufficient area is presented to the electrolyte to furnish the large quantity of current used by the cranking motor in starting against the compression of the automobile engine.

A representative starting cell has six positive and seven negative plates measuring 3-16 inch through and 5⅜ inches in length. The internal resistance of such a cell is about .005 ohm. The electrolyte in the storage battery should be at least .5 inch above the top of the plate. Although .25 inch is sufficient in an ignition battery, it will not suffice for the starting battery.

The care of the battery was dwelt upon at length by Mr. Munson, who suggested that the Society of Automobile Engineers should bring out a data sheet for the care and maintenance of storage batteries. He stated that 90 per cent. of the complaints registered against storage batteries during the past year were due to the fact that the car owner neglected the battery, either through carelessness or ignorance. The following points were particularly emphasized in his instructions on battery care:

Some Points on Battery Care

1.—Vents must be kept free or the cell will explode due to the formation of gases under pressure.

2.—Battery must be cleaned frequently and terminals greased to avoid the composition by contact with acid spray.

3.—Battery should be stored away when not in use after having been put through one of the many processes recommended by battery manufacturers.

4.—Water should be added from time to time and not electrolyte.

Discussion was then called for by Chairman Anglada. Some of the principal points of which are brought out in the following:

Mr. Slawson—What is the difference in plates for batteries intended for lighting and those for starting?

Mr. Pratt—A battery that can be used for starting can be used for lighting and ignition, but it does not work the other way; namely, a battery for ignition or lighting may not be satisfactory for starting. A starting battery calls for a very high discharge rate.

Mr. Nightingale—Regarding thickness of plates, the thick plate is used with the ignition battery because the discharge rate is relatively low, and you can discharge every atom of oxide in the plates. In a starting battery it is directly opposite, and a very thin plate is used which may be

called upon to discharge at the rate of 150 amperes 6 volts for 4 or 5 seconds. You consequently need plates that will give a high surface discharge, and there will not be any need of a thick plate, as the inside of such a plate could not be used at this rapid discharge rate.

The effect of sulphation and short-circuiting by placing a pair of pliers across the terminals would be very bad, and an explosion would follow, as the oxygen and hydrogen would be exploded by the spark. Sulphation and plate buckling is a relatively slow process. You can discharge a plate below 1.85 volts, in fact to zero, and do it many times, without serious injury, but the longer you do it the greater the damage.

The battery business is becoming very important; one company has already signed for 100,000 batteries for 1914, another company for 40,000, and others for large numbers. Manufacturers should go into the subject of battery equipment to a greater extent.

CHAIRMAN ANGLADA—What is the life of a battery used in combined lighting, starting and ignition service?

MR. PRATT—This is entirely up to the user of the car. There is very little trouble if the battery is looked after, but so frequently the owner fails to add distilled water when necessary, and does not read his instruction book. The plates should be well covered with water, some battery makers reqiring .25 inch above the tops, others .5 inch, and some others 1.25 inches. Only pure water should be added. It is generally a mistake to add acid to the battery because there is little danger of it evaporating or losing in volume if the cell is properly made. The matter of batteries is largely a question of practical instruction books to owners. The instructions should be brief and explicit and not long technical explanations. Batteries should be placed in an accessible position, and the instruction book should be carried in a part of the car where it is certain to come before the driver's attention. Poor wiring of many cars is responsible for several battery troubles, and a better system of conduits should be used.

MR. SMITH—The Edison Company has not yet developed a battery intended for starting purposes, but will sooner or later. The company at present has a gasoline car operating with an Edison starting battery and during the last 8 months it has given good service. The Edison lighting battery is guaranteed for 5 years and discharging to zero does not hurt it and overcharging does not damage it. There should be a distinction made in instructions issued for lead and alkaline batteries. What suits one does not suit the other. If the S. A. E. is to take up the question of standardizing certain battery features and promulgating instructions for battery care there should be separate instructions for these types of batteries.

CHAIRMAN ANGLADA—Do battery makers prefer to manufacture batteries for starting, ignition and lighting with 24 or 6-volt discharge rate?

MR. PRATT—This question should be settled by the car and self-starter makers. The 24-volt battery, with the same kilowatt capacity as the 6-volt battery, will cost more to manufacture. The quest resolves iself into one of dollars and cents. The trend to-day is toward 6-volt systems.

Q. What has the Automobile Club of America done relative to standardizing ignition batteries?

MR. MCMURTRY—Nothing definite. One of the worst difficulties with ignition and starting batteries to-day is their inaccessbility and the lack of attention they receive, due, not infrequently, to car makers who fail to impress on the buyer the necessity of giving the battery frequent attention, and also the failure of makers of dynamo charging outfits to impress on buyers the necessity of battery attention. The battery-charging problem is a comprehensive one. Take a passenger car in the summertime traveling practically all day on the highways and with little night travel. There is little drain on the battery for lighting and much time for charging. Contrast this with the same chassis with its limousine body for winter use. Little driving is done during the day, and frequently it stands in front of the theater, hotel or club for 6 or 7 hours in the evening with the lights burning. Because of this wide difference in service dynamos should have different charging rates which could be adjusted to meet these conditions.

MR. MUNSON—Much battery trouble has been due to chauffeurs and others using wrong sizes of wire when making repairs in the wiring system.

MR. STURGIS—We should try and standardize the discharge rate of batteries. How many square inches of battery plate surface are needed to give a current of 1-ampere discharge for 10 hours? This should be standardized. Is it not conceded that 20 to 25 square inches of plate are needed for such a discharge? If so, a plate 4 by 5 inches has a surface area of 40 square inches, and would approximately give such a discharge for 20 hours. I think the most important work the S. A. E. could do would be to adopt a standard discharge rate. Adopt one for lighting batteries which might approximate 10 hours; one for starting batteries which might be 1 hour, and another for ignition batteries.

MR. NIGHTINGALE—One of the most important things that battery makers should look after is the standardizing of battery boxes.

Use of Magnelium for Pistons

After a short recess had been taken, the meeting was called to order for the reading and discussion of the second paper on Light-Weight Reciprocating Parts for Automobile Motors by Mr. Machol. The metal magnelium was recommended by the author of the paper for use in pistons and connecting-rods. A chart made at Cornell University to show the value of magnelium as a bearing metal was shown to indicate that in this respect the requirements of a piston were fully met in a manner which promised superiority to cast iron in this respect. The temperatures at which the coefficients of friction were determined were so low that they did not furnish an indication of what would occur in this direction when the metal was subjected to the high temperatures of combustion.

Mr. Machol dwelt on the high conductivity of the metal as compared to that of cast iron. He mentioned this high conductivity as off-setting the highest specific heat of the metal. The result was that the dome of the piston was cooler than with the cast-iron piston because the heat was rapidly carried away from the dome down to the walls or skirt of the piston.

Owing to the fact that the specific gravity of the metal is one-third of that of cast iron and since the same pattern may be used in the casting work, the weight of the reciprocating parts could be reduced 66 per cent. This gave a higher possible velocity of the motor, since one of the limitations upon speed is the inertia of the reciprocating parts.

Mr. Machol also suggested the use of magnelium for connecting-rod purposes and stated that out of three motors fitted with these, one was unsatisfactory and the other two are giving perfect satisfaction. The section of the connecting-rod is in the form of a Maltese cross and not of the common I-beam type. It was stated that in this light outfit it would be possible to do very well with two big end bearing cap bolts because the strains put upon the car retainers would be so small that there would be no fear of fracture. It was pointed out that while magnelium is stronger than cast iron, its elastic limit is but one-third that of the alloy steel used in the manufacture of connecting-rods.

Discussion on this paper brought out the facts that experiments at the laboratory at the A. C. A. on a two-cycle motor showed that the deflector plate on top of the piston was burned away, owing to the fact that the heat is not carried away by sufficient rapidity. Mr. Machol stated that the concern using this motor had since poured out the deflector plate and fitted it with ribs and was now having entire satisfaction with these pistons. It was a matter of carrying the heat down to the skirt of the piston with sufficient rapidity to keep the deflector plate below the melting temperature of the magnelium.

Fuel Prices Affect Car Market

¶ From a discussion before the American Society of Mechanical Engineers by William T. Magruder, Professor of Mechanical Engineering at Ohio State University.

The smaller proportionate number of motor cars used in England as compared with this country is doubtless due to the relative prices of suitable fuel. I was informed that there are 150,000 motor cars in Great Britain for a population of 50,000,000 people, or about three cars per 1,000 of inhabitants. In this country almost 1,000,000 motor cars were registered in 1912, to say nothing of the motorcycles, motor boats and other users of oil-power; or one car for each 100 of the inhabitants of the United States, and that the ratio of cars to people in this country is three and one-third times as large as in Great Britain. If there were the same proportionate number of cars used in Great Britain and on the Continent, for which I have no accurate figures, as in America, the price of fuel in Europe would be still greater than it is. But to this large number of motor-car engines must be added more than 1,000,000 gasoline engines used for farm work and in motor boats in this country. Taking the average horsepower of the motor cars to be 25 and of the motor boats and farm engines to be 10, 35,000,000 horsepower of gasoline engines are immediately available for the practical generation of power in this country. Suppose they used as a minimum at rated load .75 pound or 1 pint of gasoline per horsepower per hour for 1 hour of use they would generate 35,000,000 horsepower and require 4,500,000 gallons of gasoline at an estimated cost of $700,000. The total annual supply of American gasoline is estimated to be 1,500,000,000 gallons, and that would last only 333 hours. If every gasoline engine were run at its rated load each day, the annual distillation of gasoline in this country would be sufficient to permit them to be operated for only 1 hour per day, or 333 hours per year. In other words, our present annual output of gasoline is sufficient to operate continually at their rated load only 5 per cent. of the gasoline engines now sold and in operation.

It is probable that some other fuel than gasoline must come into use for oil engines and that this fuel will be kerosene. When the vast amount of kerosene that is now on the market is realized, 3,000,000,000 gallons being distilled annually, it seems certain that kerosene oil will come into very great and general use in the next few years as a fuel for motors.

Non-Poppet Motors Influence Poppet Types

Poppet valve designers seek silence and positive action of newer type

Part I

By E. P. Batzell

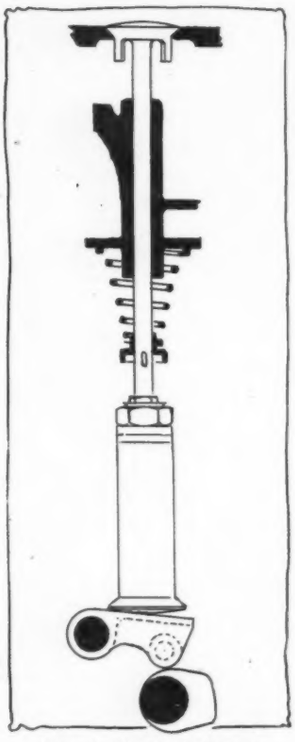


Fig. 1—Novel design of Adler valve

THE advent of the non-poppet valve motor could not fail to be of some influence on the development of poppet-valve type. It is perfectly natural that the older type should make visible efforts to restrain the success of its competitor by following it in some of the approved features. These imitations and improvements are absolutely essential for the purpose of attracting the attention of the public and its goodwill. Otherwise even the mere attraction of a novelty is apt to direct a big majority of the buying public towards the non-poppet valve motors in all those classes of cars, where there is sharp competition between the two types. On the other hand, improvements in poppet valves, in the details where they are surpassed by the non-poppet type, will appeal to those who prefer a better motor of the old type to a new one which may eventually lead the field, but the supremacy of which is not quite decided as yet.

The present situation develops into a more or less sharp contest for supremacy between the two motor types, which though of recent origin already has been of great benefit to the buying public, inasmuch as to it are offered all the competitive improvements brought out on either side.

The advantages over poppet valves generally attributed to the non-poppet valve motors at the time of their appearance are: silence of the valve mechanism; positive character of valve operation, resulting in better motor performance at high speed.

Certain groups of non-poppet valve motors have also demonstrated the following specific advantages over the average poppet-valve motor.

Practically complete absence of wear in those valve parts on which is based the permanent tight closing of the cylinders. Therefore less care is required to avoid leaks in the latter, the leaks being forthcoming only independent from the valve mechanism.

Neat, clean construction of the exterior making a motor of attractive appearance, catching to the public eye.

Big power development per cylinder volume, the power rising steadily up to very high motor speed.

Great endurance, equivalent to absence of trouble, and efficiency.

Simplicity of construction as seen in the limited number of parts in the valve mechanism, etc.

Against this the poppet-valve motor can show only advantages the very existence of which is more or less doubtful. These are: cheaper manufacture, less weight and the fact that the older valve is more universally known and understood, thus facilitating repair and service work.

At present considerable attention is being concentrated on the making of a silent poppet-valve mechanism. The investigation of improvements developed for this purpose is best carried out point by point in respect to the different sources of noise.

These sources of noise are to be found in the valve striking its seat; the valve tappet striking the valve stem or the lifting cam after having left it for some reason or other; worn tappet guides; noisy camshaft driving gears, etc.

The non-poppet valve motors, of course, also require some driving means, such as gears and the like, which too are apt to become noisy in time. But there is considerable difference in the action of the valve mechanism of the two types, the gear being a special source of noise in the poppet-valve motor.

The drive of non-poppet valves is often uninterrupted and uniform, or in those cases when it is of intermittent character the change of the driving speed and direction occurs gradually without causing perceptible jerks and shocks in the whole mechanism, including the gears themselves. On the other hand, at each revolution the motion of the cam in lifting a poppet valve passes through a point when the reactive action of the valve spring tends to drive this cam ahead of its regular motion. Thus the camshaft gear receives an impulse from the valve spring for an instant making it the driving member of the gear train. Depending on the spring effort, the mass of the camshaft and gears, the duration of the period occurring when the drive is reversed, which in its turn depends on the speed of the motor and the number and spacing of cams, it is possible to meet that condition when the forward motion of the camshaft gear is sufficient to take up the backlash between its teeth and those of the actual driving member. This will bring into a more or less abrupt contact the respective tooth sides which are opposite to the working ones. The subsequent effort upon the camshaft to lift the next following valve will again turn the camshaft gear into the driven one.

Prevention of Gear Noise

Such a fast alteration of efforts upon the gears and of their contact surfaces will result in a very pronounced gear chatter unless the clearance between the gear teeth is made and remains very small. *This particular kind of gear noise is entirely foreign to non-poppet valve mechanisms. Moreover, the explained reason of this noise also prevents the possibility of an entirely silent camshaft drive, even with spiral or herringbone teeth, inasmuch as these are not free from backlash.*

After the appearance of the non-poppet valve motor with its more or less silent valve drive, increased efforts have been applied to eliminate the above gear noise in the poppet-valve motors, using various methods.

In one of these an attempt is made to decrease the swinging motion of the camshaft and its gear by increasing their mass and also by offsetting the valve tappet from the camshaft center

line towards the oncoming cam. The camshaft gears were provided with lead fillers for the purpose of increasing their mass and also to dampen their ringing sound. The idea of another very interesting construction used on some foreign cars is illustrated in Fig. 1. Here the camshaft gear is made in two parts, one of which is mounted solidly upon the camshaft and actually serves for driving it. The other part is also provided with teeth of the same diameter and pitch as the first one, but it is centered free upon the camshaft and also meshes with the driving gear. Springs are mounted inside of these two gear parts which tend to separate them from each other in the direction of their rotation. By this means continuous contact is maintained between the active tooth surfaces of the driving gear and the one fastened to the camshaft. At the same time the free side of the driving gear teeth are also kept in contact with the free gear part by the spring action, thus eliminating completely any possibility of backlash, except by compressing the gear springs. It is not necessary to have the latter of great strength to make them resist properly the driving action of the valve spring. This construction has given satisfactory results in practice, although it adds some complication to the valve-driving mechanism.

The use of silent chains for camshaft drives has been advanced by the non-poppet valve motor, and a number of poppet-valve motors are also built that way now. This drive method is still gaining popularity, although it is not free from disadvantages. It is not even perfect in the matter of silence, which is the chief reason attributed to its displacing the camshaft gears, but the nature of the chain noise is entirely different from that of the gears. *The silent chain has a tendency to vibrate, especially when the center distance between the chain pulleys is great and the motor runs at high speed. The stretching of the chain increasing its slack acts the same way. This chain vibration causes a very disagreeable rumble, as against the ringing noise of gears.*

Vibration in Chain Drive

The rotation of the poppet-valve camshaft, which is not perfectly even, as formerly explained, can have bad results upon the chain drive, particularly when the vibrations of the camshaft are synchronized with those of the chain. At those moments the chain noise is much increased, and, besides, there is danger of the chain breaking. The proof that the chain noise is chiefly a matter of synchronized vibrations can be readily seen in the fact that it is present only at certain motor speeds, regardless of the vehicle being in motion or standing still. And it is also generally possible to reduce the running noise after it has become quite loud by speeding the motor up beyond the range of resonance or by slowing it down. By further increase of the motor speed one strikes another range of synchronized vibrations, indicated by the reappearance of the rumble, whereas in the intermediate zones the motor runs comparatively quiet. It should be anticipated that further practical evolution of the chain drive will be marked by the introduction of some damper construction which would eliminate the possibility of synchronized vibrations there.

Passing on to the quieting of the poppet valve proper and its lifting mechanism, it must be admitted that very little advancement has been made in forcing the valve head to come to its seat in a silent manner. The writer is familiar only with the Adler valve construction, Fig. 2, which could lay claims to have accomplished this very desirable feature. It will be noticed in the illustration that the valve head below the common conical seat surface is provided with a cylindrical part which fits more or less tightly into the opening of the valve port machined in the motor cylinder casting. The valve itself is in continuous motion during most of the time, its conical face resting on the seat in the cylinder casting only for a short period at the time of the explosion.

For a large part of the compression and explosion strokes when the conical part of the valve head is not seated in the cylinder, the fit of the circular valve head extension into the valve port opening is solely relied upon to keep the cylinder tight. This it is claimed to accomplish satisfactorily. The actual valve opening begins when the circular head is lifted above the edge of its port, at which moment this head still remains guided in the latter by some projected portions of it. The shapes of contact surfaces between the cam, the rocker arm and the valve tappet can be made very favorable for a good character of valve opening. The valve closes the cylinder when the edge of the cylindrical portion meets the walls of the inclosing port opening, and there remains comparatively long compression period during which the conical portion of the valve head is brought down upon the seat. The length of this available period enables the valve parts to be shaped so that the lowering of the valve is carried out in a very gradual manner, leaving no audible sound of the contact between the valve and the seat.

Silence by Valve Setting

The gradual prolonged valve lifting and setting is feasible also with the ordinary poppet valves when roller or roller-shaped valve tappets are used. But this period of gradual lifting and setting has a limit and can only be prolonged in the poppet-valve motor at a sacrifice of the valve opening efficiency.

Silent valve setting becomes imperative when the motor is desired to run quietly at all speeds.

At low motor speed the average rate of valve closing velocity is slow enough not to cause noise.

At a certain higher motor speed the force of the valve return spring begins to be inadequate to preserve the valve and its tappet in continuous contact with the lifting cam, the latter speeding away from the return motion of the valve and tappet.

This leaves the valve free to strike its seat with full force of its spring and of its own inertia in addition. The extent of the sound thus created cannot be limited by the inclosing cylinder walls and water-jacket. It is plainly heard outside. Such noise is best realized by comparing it to the single sound of a stuck valve when released.

Strong valve springs and light valve parts help to reduce, at a high motor speed, the extent of the noise at the valve seat, and, by the way, that also between the cam and tappet. On the other hand, any arising cause which restricts the free return motion of the valve parts is apt to make conditions worse in respect to this noise.

These are practically the only points considered by the majority of motor manufacturers with the object of eliminating valve seat noise, the Adler construction being an exception. The steps taken prove to be far from giving complete satisfaction, and there is no doubt that the non-poppet valve motor can be an easy victor in this particular respect should there be made no further improvement in the poppet valves.

(To be continued.)

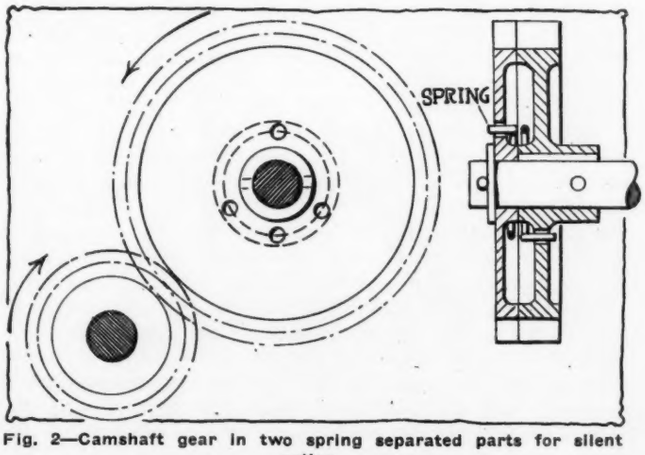


Fig. 2—Camshaft gear in two spring separated parts for silent action

Digest of the Leading Foreign Journals

Banking a Hairpin Turn on Road Race Circuit for Spectacular Speed, Either With or Without Saving of Tire Strains—Devices Looking to the Avoidance of Special Motor-Starter Equipment—Balkan Trade News—Impervious Cloths Coming

BANKED Turn for French Road Race—Emulating the American practice of adding to the spectacular interest of a long-distance road race by banking sharp turns, so as to enable drivers to take them without slowing up, the sport committee of the Automobile Club of France has decided to have one such banked turn for the *Grand Prix* race to be run over the Picardie circuit on July 12. The banked stretch will be constructed at Longueau, so as to connect the Noyon and the Montdidier roads which here fork into one another and which form portions of the circuit. The radius of the turn will be made 50 meters. No other details seem to have been definitely decided, but the calculation of a suitable construction has been entrusted to the laboratory engineer of the club, and the latter has made known how he will figure the angle of the bank so as to make the turn safe at any speed which may be considered the maximum allowable. From his example, as given below, it may perhaps be inferred that 60 kilometers per hour is considered a sufficiently high speed at a hairpin turn for engaging the interest of spectators.

On this occasion it is brought to the public's attention by another French engineer and publicist that the nature of a race, in conjunction with the science involved in the proposition, calls for something more than the mere determination of one angle for the bank, as the slope should probably not be rectilinear but either hollow or convex. On bicycle and motorcycle tracks it is convex, as in Fig. 1, while on the Brooklands track it is hollow, as in Fig. 2. In one case the angle decreases from the foot of the bank toward its top, and, as the transition from the larger to the smaller angle is gradual, the slope becomes curved. In the other case the angle increases, and a car driven near the outer edge of the curve is enabled to speed up more, without upsetting or skewing, than one driven along the infield line.

The track is made convex for the cycles because the radius of turns is short while the track is broad. This makes a large difference of radius for the outside and the inside of the curve and, as the centrifugal force which causes skewing and upsetting is in inverse proportion to the length of the radius, for a given speed, it is necessary to bank the sharper inside curve more steeply than the outside one in order to give all the cycles an equal chance for speed.

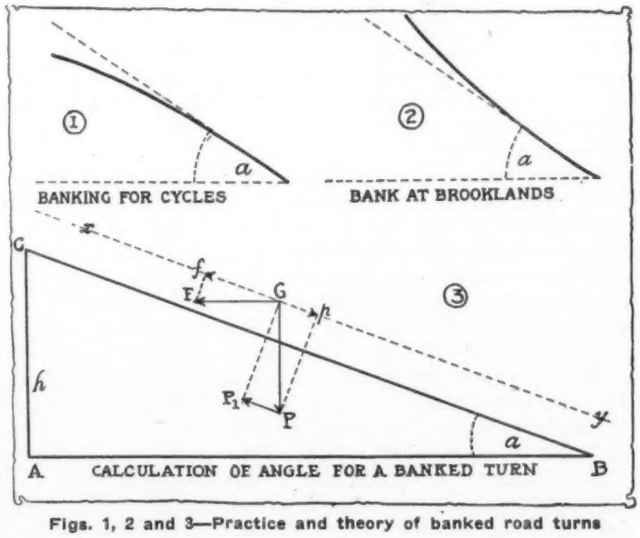
Other considerations prevail for automobiles. They are always raced "with the clock" (so far as the circuit as a whole is concerned, though not at every individual turn) and are usually started at intervals. Unlike the cycles, they are vehicles which are in stable equilibrium, and it is one of the merits required in their design and construction that they shall be able to hold the road at high speed, even on an unbanked road. The assistance given them by banking the road is not vital; in fact, if overdone, it detracts from the technical interest in the results. But it is essential to the racing interest that one vehicle is not prevented from passing another at a sharp turn by developing higher speed at such a juncture. Also, according to the rules of road and race alike, the speedier vehicle must pass to the left of the slower one. To enable it to do so, on a turn to the right—which is the kind largely in the majority when a closed circuit is followed "with the clock"—the outside of the road, where the faster vehicle must pass, if at all, must be banked high enough to allow the superior spurt. This consideration overbalances that due to the width of the road and makes a slightly hollow banking the preferred construction. And this shape of the roadbed has another effect, according to the authority quoted. It causes a vehicle to turn sidewise on the road immediately, if it throws a tire at the turn.

[Similar reasoning would speak for a convex banking at left-turns, and as the whole matter of banking for a road race is a compromise, the mathematical accuracy of which becomes nullified through conflict of the things which the racing men must consider—such as that of selecting tires suitable for the average road surfacing of the circuit as well as for that of the banked turn or turns—a plain rectilinear banking should scarcely be unacceptable for a speedway.—ED.]

The club's engineer finds the angle of the bank in the following manner:

He assumes that the object is to connect the two roads by a banked curve following the arc of a circle whose radius is 50 meters; that the width of the road is 8 meters; that the weight of the vehicles is uniformly 1500 kilograms, everything up [though this item is immaterial in his calculation], and that the center of gravity is at a uniform height in these vehicles.

Fig. 3 shows the elements entering in the calculation, the line AB representing the width l of the normal horizontal road, CB the slope of the bank, a its angle of inclination to the horizontal and h the height to which the road is raised at the exterior edge of the turn. G is the center of gravity of the vehicle. The avowed object is to enable a vehicle to pass around this curved road at a certain high speed without having the centrifugal



Figs. 1, 2 and 3—Practice and theory of banked road turns

force, acting at G, capable of displacing G along the line *yx* which is drawn parallel with the banked road surface through G. The only element resisting this displacement is the friction acting against lateral displacement at the ground contacts of the four wheels; the co-efficient of this friction is denoted *f*. It is known in practice to vary from 0.1 to 0.6 according to the tires and the road surface, and a middle value of 0.2 is assumed for it on the supposition that the banked surface is concreted and provided with rills.

The forces acting at G are P, the weight of the vehicle, and F, the centrifugal force, and F can be expressed, according to a recognized formula as equal to $\frac{PV^2}{gR}$, or mass multiplied by the square of the speed, divided by the radius of the curve (*g* being the divisor 31—our 32.16—by which mass is determined from P).

To find how these forces, acting at a right angle to one another can act upon G in the line *yx*, which is the line in which movement can take place, they are projected upon this line. The projection of P (represented in the line GP) is *p*, which equals: P sin. *a*, as appears from Fig. 3. Similarly F has a projection *f* on *yx* equalling F cos. *a*. These two forces are opposed and the force F_1 which causes skewing is therefore *f* minus *p*.

$$F_1 = f - p = \frac{PV^2 \cos. a}{gR} - P \sin. a.$$

The skewing will not take place so long as F_1 is smaller than F_2, the latter being the amount of lateral friction resulting from that portion P_1 of the weight P which may be considered as pressing vertically upon the banked surface.

The expression for F_2 is, as appears from Fig. 3: $F_2 = fP_1 = fP \cos. a$.

The condition for the stability of G under the forces which work upon it laterally is that F_1 is smaller than F_2, or, in the equivalent terms for these values:

$$\frac{PV^2 \cos. a}{gR} - P \sin. a < f P \cos. a.$$

To simplify, divide on both sides by cos. *a*:

$$\frac{PV^2}{gR} - P \text{tg}. a < fP.$$

Eliminating the common factor P, there is obtained a value for tg. *a*:

$$\text{tg}. a = \frac{V^2}{gR} - f,$$

which is the smallest value tg. *a* can have, since with this value F_1 and F_2 are equal.

The height *h* of the embankment is *l* tg.*a*, and the smallest value for this height is thus:

$$h = l \text{ tg}.a = \frac{lV^2}{gR} - lf.$$

[In this demonstration it does not seem entirely obvious why the numerical value of *f*, being graphically, as in Fig. 3, the projection upon *yx* of the centrifugal force acting horizontally upon the center of gravity G, may be taken as an equivalent of the co-efficient of friction. The contention seems to be that *f* has precisely this value because the force it represents is that portion of the centrifugal force which would have to be resisted through the lateral road friction, if *p* did not intervene, acting in the opposite direction, and because it holds a fixed relation to the weight of the vehicle, being derived from the centrifugal force which in turn is derived from the vehicle weight. Readers with mathematical energy to spare for this problem might perhaps throw more light upon this element in the calculation.—Ed.]

By applying the assumed numerical values for *l*, V and R to the formula for *h* and taking 0.2 as an acceptable value for *f*, as above referred to, one gets:

$$h = \left(\frac{8}{9.81} \times \frac{16.5^2}{50}\right) - (8 \times 0.2) = 2.84 \text{ meters},$$

in which 16.5 stands for the speed in meters per second corresponding approximately to 60 kilometers per hour.

If the banking were to be made so high as to provide safety without reliance upon the lateral friction of the tires with the ground, *f* should be taken as O, and by inserting this value in the preceding formula, it is found that the height of the bank in that case should be 4.44 meters, or more than one-half of the width of the road.

When banking of this kind is contemplated—and it has the advantage that the throwing of tires at the turn is made less likely to occur—and the calculation is made for a certain width of the road and a certain maximum speed, so that *l* and V become constants, the formula for *h* can be simplified to:

$h = \frac{K}{R}$, in which K is the constant $\frac{lV^2}{g}$, figured out in advance.

It is clear that the banking should begin where the curve joins the flat and straight road, and theoretically it should begin abruptly, since the radius passes abruptly from infinite to R. The width of the road permits, however, a gradual transition from a straight course to a turn of the prescribed radius, and the height of the bank may, in accordance with this fact, be decreased gradually from *h* to O from the point where the turn begins—and from where it ends—for some distance upon the straight road. [To give all vehicles which might be disputing each other the turn an equal chance to continue at maximum speed without departing from their relative places in the width of the road, the turn should thus really be laid out as a hyperbola or as a circular turn connected to the stretches by hyperbolic approaches, the latter banked down to the vanishing point. —Ed.].—From *L'Auto*, March 5.

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RATIONAL Compression Relief—With the usual compression relief cock the inconvenience is experienced that a considerable portion of the force developed by an explosion—in cranking for a start—is wasted, and as the explosions caused by cranking with the compression cock open are naturally weak anyway, the start is not effected until after a number of turns; namely, as soon as finally the hard labor put into the work and the succession of weak explosions have produced a sufficiently favorable condition for accomplishing the send-off.

An improvement in this respect has been devised by Mr. Galaine of France, previously known as the inventor of a muffler which adds to the power of a motor instead of diminishing it. His compression relief cock is shown in Fig. 4, giving first a general view of the little device and in the subjoined figures the positions of its piston valve C during (1) the suction stroke, (2) the compression stroke and (3) the explosion stroke. The valve D, whose upper and lower faces E and F are ground to a plane valve-fit prevents admixture of outside air with the charge drawn from the carbureter. Compression raises this disk until the lateral port of the bore H in the lower valve stem G is uncovered, affording the desired relief. An explosion, on the other hand, with its greater speed and force, drives the valve disk D up against the roof of the piston chamber, thereby obviating any notable loss of power in the driving of the motor pistons. The

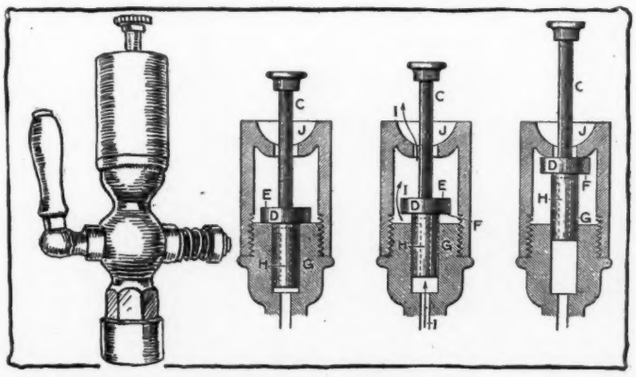

Fig. 4—Improved compression relief device to ease motor-starting.

cup J admits of squirting a little gasoline into the combustion chamber before cranking.

The practice of facilitating cranking by opening the compression cock has not been very generally followed, just because what was gained in the reduction of the physical effort was lost in the resulting uncertainty of the start [and because it is inconvenient with 4-cylinder motors]. The Galaine device, by remedying this condition, is intended to make special motor-starting devices of a more complicated nature more or less superfluous. It is especially adapted for sleeve-valve motors, says the reporter, because no decompression can be effected in these by adjustment of the camshaft.—From *Omnia*, March 15.

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THE Malivert Injector—This device is in the same class as the compression relief device mentioned in another paragraph, in so far as it is intended to make more elaborate motor-starters unnecessary. It has the advantage of being applied as an auxiliary to the carbureter, so that only one device is needed for a four-cylinder motor. Its purpose is to make sure of a rich mixture with the feeble suction produced by cranking of a motor. The tube A, Fig. 5, is connected to the drain of the carbureter under the nozzle, and a hole is made in the induction manifold for the connection with tube H which ends in a needle valve acting as a vaporizer of the fuel discharged through it. The whole apparatus is secured to the float chamber by means of a strap-clasp or similar means. A spring holds the piston of the device down to the bottom of the cylinder unless it is pulled up by means of the cable running over a pulley to the driver. Slightly below the bottom of the piston in its highest position an opening in the cylinder wall connects by channel D with the tube A and thereby with the nozzle of the carbureter, and this has the effect that, when the piston is allowed to descend, the first action is that the nozzle is made to overflow, as if the carbureter were primed. Screw E and nut F regulate this action. As the piston descends further, the gasoline mixture which has been drawn into the cylinder of the device by the raising of its piston is pushed out through valve G and tube H into the induction manifold and is sucked from there into the cylinders in addition to the charge drawn from the carbureter in the normal manner. It is stated that the use of the device makes it a certainty that a cold motor will be started at least at the fifth turn of the crank, and the priming of the carbureter, as done by the device, makes it sure that rich mixtures will be continued long enough to warm the motor, so that it will continue to run with the normal fuel feed from the carbureter. The operation involves thus only one pull upon the cable.—From *La Vie Automobile*, March 15.

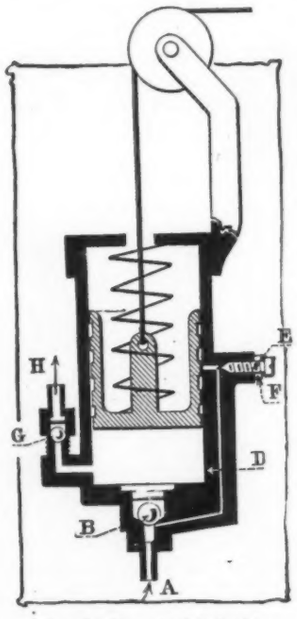

Fig. 5—New fuel injector

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MATERIALS for Carriage Upholstery.—A number of developments have taken place in the manufacture of textiles from artificial thread which may prove of interest to the motor car builder. A process by which jute is turned into artificial silk is at present under examination in the German patent office. By means of form of yeast and the addition of glycerine, on which the yeast spores feed, the fiber of the jute is freed from all resinous substance and is rendered extraordinarily fine, smooth and flexible, and the price of the fabric woven from this material can be made very low as compared with silk. It is not stated positively that the principal fault of ordinary jute, which is that of becoming brittle under the influence of air, light and moisture, has been removed, but the material may at all events be available for drapings and upholstery of close vehicles.

A wider utility for automobile purposes is foreshadowed in a recent patented British invention, according to which a silk-like material is made from threads of spun glass, each of which threads is only one-thirtieth as thick as an ordinary human hair and scarcely visible to the naked eye. By the action of chemicals, this thread is made firmer and stronger than any other artificial silk, and the cost of producing material woven from it is said to be only about 30 to 35 cents per kilogram, as compared with $1.50 to $1.75 for the artificial silks made from cellulose. The most promising quality of the new material is however that it is incombustible and very resistant to moisture, acids, alcohol and oils as well as easily cleaned.—From *Kunststoffe*, March 1.

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TRADE with the Balkan States—According to a recently published report, Germany sold in 1911 to the Balkan states about twice as many motor vehicles as in 1910. The sales were distributed as follows: To Roumania, 647 passenger cars, to Servia, 79, to Bulgaria, 34, to Greece, 10, to Turkey, 82 passenger cars and 260 motor trucks. [Some discrepancies between the scheduled figures and those mentioned in the text of the report casts a doubt over the accuracy of both, however.]

In Turkey, the bulk of the trade is in the hands of England; Austria following and then Germany. America gained a foothold just before the war broke out, and a lively competition with "cheap American cars" is anticipated when, after the war is over, the expected modernization of the Balkans sets in. Americans have fortified their commercial position greatly by shrewd preparatory moves. Thus the founding of the Robert College at Rumeli-Hissar, an "excellently conducted commercial school," is benefiting them greatly; also the organization of the Ottoman-American Development Co. and of the American Chamber of Commerce at Constantinople, which was founded in March, 1911, and already counts 450 members located in all of the more important Turkish cities.

France leads in exports to Roumania, sharply followed by Italy, the sales running mostly to cheap and light cars. Lately the Americans are also invading this market. England supports her trade here by the establishment of repair shops.

Bulgaria has practically no roads, and automobiles are scarcely used for pleasure purposes at all. Just before the beginning of the war, however, American manufacturers sold a number of small cars for stage lines connecting the interior with the seaports of Varna, Baltschik and Kavarna, and these became very popular. When it was decided to enlarge this traffic the demand turned to larger cars, and the orders for these were placed in Germany.—From *Allgemeine Automobil-Zeitung*, February 28.

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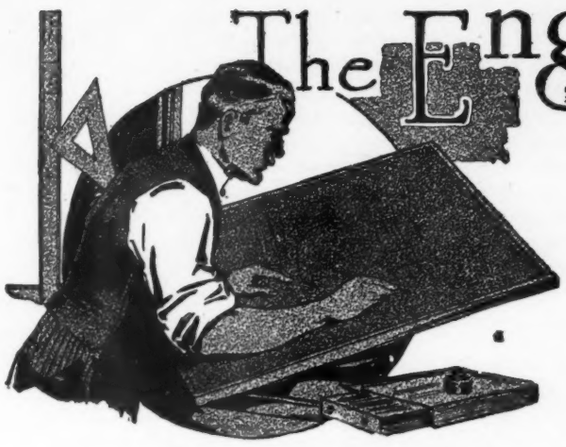
Storage Batteries to Oust Magnetos—It is prophesied by the owner-editor of *La Pratique Automobile* (Feb. 25), that the magneto, which chased the small storage battery from the ignition equipment of automobiles, will disappear from the market in a few years, and that the storage battery will be reinstated as a spark-producer. The prediction is of course based upon the great popularity of electric lighting for cars, which in turn was the result of the perfecting of the tungsten incandescent filament. The need of a generator to supply the electric light current, of a battery for equalizing it and the opportunity for employing the same force for the starting of the motor are considered an irresistible combination compelling the use of the same equipment to furnish the ignition current, and consequently making the magneto superfluous. That the generator can keep the battery constantly charged, while formerly no such facility was at hand (in France), is considered as affording a further guarantee that the change will come about as predicted.

The Engineers' Forum



Horsepower As Basis For Tax Discussed

Relation Between S. A. E. Rating and Legitimate Speed Is Considered by Leading Automobile Engineers

Fault Is Said To Be With Lawmakers, Not with the Horsepower Formula

Vincent Considers Tax on Power Unfair
Not in Accord with Laws, Porter Claims
Education of Legislators Needed—St. John
S. A. E. Formula Very Fair, Says Bohn

WITH reference to the article "Cars Taxed on Unused Horsepower," printed in THE AUTOMOBILE of March 27, a number of leading automobile engineers have communicated with this office and have expressed their opinions which bring out many new details and in a general way agree with the argument of the above-mentioned article. The trouble, it seems to be admitted generally, lies with the law rather than with the formula. The communications follow:

DETROIT, MICH.—Editor THE AUTOMOBILE:—Taking the horsepower of a motor as a basis for taxation is a rather unfair proposition to the owner paying the taxes, unless the taxes are low per horsepower. The power of a gasoline motor increases as the speed increases, up to certain limits. These limits, however, are reached at speeds ranging from 1,600 to 2,000 revolutions per minute. A motor which pulls 67.5 horsepower at 1,600 revolutions per minute will not pull more than approximately 39 horsepower at 750 revolutions per minute.

The A. L. A. M. horsepower rating is based on a piston speed of 1,000 feet per minute, with the bore of the cylinder taken as one of the factors. Considering the stroke of the motors in use to be approximately 5.5 inches, it is necessary to attain 1,200 revolutions per minute to reach 1,000 feet of piston speed per minute. With the standard gear ratio of 3.5 to 1 in the rear axle, a car would attain a speed of 37.5 miles per hour when the motor had reached a speed of 1,200 revolutions per minute. As this speed would be largely in excess of the law controlling speed limits, it hardly seems fair to base taxation on this speed.

Assuming that the law will allow an operator to drive 20 miles per hour in districts in which he is paying motor taxes, the speed of his motor will be but 640 revolutions per minute, or, approximately 35 per cent. of the speed at which it probably pulls its maximum power, and also a speed of but 53 per cent. of that required to reach the A. L. A. M. rating.

Of course, the average automobile will never average 20 miles per hour through districts where motor taxation is in vogue, or, in other words, in cities. I doubt if the average of a motor car in Chicago or New York would be in excess of 8 to 12 miles per hour, or an average motor speed of but 320 revolutions per minute. This would be less than 27 per cent. of that required to reach the A. L. A. M. rating. So that a 40-horsepower motor based on A. L. A. M. rating would not average over 11 horsepower in city use and could not reach 40 horsepower without attaining a speed of 37.5 miles per hour. There are conditions, however, in which the motor, in service in the city, will show considerably more power than this average of 11. These conditions arise when accelerating and using the gears of the transmission, for instance, in first and second speed. It is safe to assume that the car will never travel faster than 15 miles per hour in second speed, which, with an average gear ratio in the rear axle of 3.5 and an average of 6.3 as a total for second speed ratio, would give a motor speed of but 835 revolutions per minute. With these conditions and with a stroke of 5.5 inches, we have less than 70 per cent. of the A. L. A. M. rating, and must also consider that acceleration in second speed is very brief and not of frequent occurrence.

Allowing the Government to assume an average of 20 miles per hour instead of an average of 10, for the use of the car on the city streets, we still only have 53 per cent. of the speed required to reach the A. L. A. M. rating. I would, therefore, be of the opinion that if the motorist concedes twice the average speed at which he is really using the car for a basis of taxation, it certainly should be fair to the Government and this would make a basis of approximately 50 per cent. of the A. L. A. M. rating for horsepower.

The formula for calculating A. L. A. M. horsepower is as follows: The square of the cylinder diameter multiplied by the number of cylinders divided by 2.5.

The advent of the six-cylinder motor has certainly relieved some of the wear and tear on the city streets, owing to the smoothness with which it turns the wheels. An uneven effort to turn the rear wheels without doubt causes more slippage and hence more destruction to the street than does an effort of continued smoothness. There is little doubt but that a six-cylinder motor is easier on tires than a four-cylinder, and, if it is easier on tires, it must be easier on the pavement. The production of six-cylinders in proportion to four-cylinders is largely on the increase, and any taxes for repair of streets should be on the decline rather than on the increase.—J. G. VINCENT, Packard Motor Car Co.

Automobile Taxes High Enough

TRENTON, N. J.—Editor THE AUTOMOBILE:—To my mind the horsepower proposition is very clear, and an explanation pertaining to the difference between the actual power developed on brake test, and the power developed on the road is easily given. The rating so far as the secretaries of state go is plenty high enough.

I mean by this that the speed laws of the different states holding a car to the maximum of 25 to 30 miles an hour and less in cities and towns, necessarily keeps down the revolutions per minute of a motor to such an extent that the development of more horsepower than the rating, or even as much as the rating, is impossible. The fact that the published power curves and

statements of the different manufacturers show an exact power development, should not and cannot in any way affect the action of the secretaries of state unless they permit by law speed that would permit this power to be developed.

I believe that if this matter was put in the proper light that a reduction of the horsepower rating is absolutely in order instead of an increase.

It seems to me that it could be conclusively proven that a speed limit of 30 or 40 miles per hour would not permit the development of anything like the S. A. E. rating of the different motors for the simple reason that it does not take that amount of power to propel any vehicle I know of at that rate of speed.

If an increase in the rating is proposed, it seems to me that the question above will have to be answered for the simple reason that a raise in the horsepower rating would practically mean permission to the licensed one to operate a motor developing the power specified in his license, since the license has to do only with the use of the road and does not in any way imply or demand any superior knowledge necessary for the operation of motors of different sizes.

It would, of course, be possible to raise the percentage of taxation per horsepower, but I believe the raise in horsepower rating would not be in accord with the laws as enacted and enforced.—Fenley R. Porter, Mercer Automobile Co.

Richmond, Ind.—Editor The Automobile:—The question of horsepower as applied generally to various types of power-producing appliances is, in the writer's judgment, one sadly in need of revision. The term horsepower doubtless originated far back in the early days of steam engine development and was used for the purpose of designating some idea of the energy capable of being delivered by a mechanical device, as compared with the energy which could be delivered by the well-known draft horse. Unfortunately the comparison is sadly misleading, as every engineer knows that an automobile engine rated at 40 or 50 horsepower does not in any sense represent the power equal to that delivered by so many draft horse. This is the unfortunate feature concerning the point touched upon in your communication.

If our state secretaries and lawmakers in general could be educated along this line and brought to a full realization of the real meaning of the term horsepower, much would be accomplished in a preliminary way to offset the tendency of such officials to raise the rating. In short, the old, time-honored method of power rating is and always has been inadequate, unsatisfactory and misleading and the writer would suggest the use of the word unit, one unit to equal some number of foot-pounds.

The writer's experience with long-stroke motors has proven conclusively that the power of the motor does not increase in proportion to the added length of stroke, and this point should be made clear to our state secretaries, who are doubtless of the opinion that it does and that the addition to the stroke was made wholly for this one purpose.—C. R. St. John, M. E., Westcott Motor Car Co.

Maximum Power Output No Basis

Detroit, Mich.—Editor The Automobile:—Referring to the S. A. E. horsepower rating, wish to say that in my opinion a change in the S. A. E. formula or a new formula is quite necessary. It is true that the S. A. E. rating is very conservative, especially for dynamometer work. However, as the results obtained from an explosive motor in a chassis are quite different from those obtained from a block test, due to the atmospheric conditions and other conditions beyond the control of the operator, it is quite reasonable to assume that the horsepower delivered by the average motor in actual use, and at various speeds, is a close approximation to the S. A. E. rating. If we were to assume that every driver of an automobile were an expert in the handling of explosive motors, the average condition would be radically different. In my opinion it would be rather unfair to base taxation upon maximum results which are possible under certain conditions.

It is quite true that nearly every motor and automobile manufacturer already has, or is planning to adopt what is known as the "long-stroke" motor. Some of these manufacturers have in the past produced motors having a bore in excess of the stroke, from which excellent results were obtained so far as actual performance and power delivered were concerned, and it is true that such motors can be commercially built weighing less per horsepower than a great many of the later so-called "long-stroke" motors.

I really believe it will be a mistake to alter the S. A. E. formula, as in my opinion it is very fair. It is quite common practice, when conducting block tests, to indicate in the report of such tests the horsepower of the motor according to the S. A. E. formula; also to indicate the horsepower nominally delivered on the block, which in nearly every case is in excess of the S. A. E. rating, but, as before stated, the power delivered by the motor in actual service in all probability very seldom exceeds to any great extent the S. A. E. rating.—G. G. Bohn, Hudson Motor Car Co.

Necessity of Rich Fuel Mixtures

Branford, Conn.—Editor The Automobile:—In reading the discussions of the subject of carburetion which have recently appeared in your columns, one is forcibly impressed by the divergence of the views therein expressed.

Coupled with the statement that a rich mixture is necessary for a quick get-away, we are told that this means a waste of fuel, from unconsumed gases, at ordinary road speeds.

Excessive air at high speeds is said to give cylinder pressures endangering present construction, in the face of repeated statements that maximum power is secured from a mixture containing less than the theoretical amount of air necessary for perfect combustion.

Carbonic oxide, CO, in the exhaust is shown to demonstrate a definite heat loss and yet the antagonists of exhaust gas analysis quote erratic results and even enviable mileage with large percentages of CO present.

Chemists demonstrate that 14.94 pounds of air are necessary for the perfect combustion of 1 pound of gasoline vapor, but the consensus of opinion leans toward an excess of fuel for maximum power.

The intake manifold is cited as a necessary evil, while, on the other hand, glass construction has shown that vaporization is completed only in the manifold.

The plea is made for some method of filling the vacuum behind the pistons, in other words, increasing the volumetric efficiency on open throttle, while in the same discussion the statement is made that the velocity in the intake manifold "is from 300 to 400 feet per second," equivalent, in itself, to a direct loss of volumetric efficiency of from 5 to 9 per cent.

Finally, the most sweeping disagreement is reached in the statement that "the American public will not accept a carbureter that gives a uniform mixture under all conditions, but demands a quick get-away, economical running and a powerful mixture at maximum speed." This assertion closely follows a statement in the same discussion that "The rate of flame propagation in a gaseous mixture, other things being equal, is near its maximum at a 12 to 1 ratio. The rate decreases with departure from this value in either direction."

How can these statements by the same author be reconciled? Maximum rate of flame propagation means maximum pressure. Maximum pressure means maximum power output. Why then should the mixture entering the cylinders of an automobile engine be subjected to change? Not for speed, certainly, for the

ideal mixture is the quickest burning. Not for power, for it gives the maximum explosion pressure. Not for starting, for it is the most easily inflammable.

The operator of a stationary gas engine, using, let us say, city gas, does not change the setting of his gas valves except to meet variations in the composition of the gas itself, or to compensate for barometric changes. Why should any greater variation of charge be necessary in the automobile engine?

Consideration of this question, in all its varied aspects, involves prolonged discussion, but it is possible that one phase of the subject has been underestimated which, when carefully considered, will help to reconcile many, in fact, most, of the conflicting arguments.

The process of carburetion consists of two equally important factors:

First: Quantitative mixture of liquid fuel and air.

Second: *Complete* vaporization of the liquid and *complete* absorption of the vapor by the air.

Claims for the first of these primary functions are better substantiated in the advertisements than on the road, but rarely does one note even recognition of the second, but none the less important function. Occasionally, to be sure, one hears the claim for "dry gas," but this feature has been largely obscured by the numerous attempts to perfect the chemical composition of the mixture under varying conditions.

As a result a large portion of the charge from the average carbureter consists of gasoline spray, or mist, carried in suspension in rapidly-moving air columns. Under these conditions necessary physical contact of the oxygen with the fuel molecules is impossible, so that the fuel is but partially consumed, resulting in large percentages of CO in the exhaust and, very probably, in utterly untouched fuel when the exhaust valve opens.

Consider, too, how much greater is the density of the *liquid* gasoline than that of its *vapor*, and, remembering that some portion of the fuel from the average carbureter reaches the cylinder in a liquid state, even if minutely subdivided, it is readily seen why a greater proportion of fuel than is theoretically necessary has come to be considered the most effective.

This feature of carburetion is perhaps best illustrated in starting a cold engine. Let us assume that the carbureter is delivering a mixture of, say, one part of gasoline to fourteen parts of air (by weight). When the engine is cranked, owing to the low temperatures present, only a small portion of the fuel atomized becomes a gas. The remainder is speedily released from mechanical suspension in the relatively slow-moving air column, and is promptly deposited on all interior surfaces, so that the gaseous mixture reaching the cylinders is far too lean to be inflammable. Increasing the amount of gasoline by priming increases the total amount of fuel *gas* present in the charge by an amount dependent largely upon whether the priming charge be atomized or not, or whether it be volatilized by the heat of compression from the act of cranking. In any event it is solely the *gaseous* charge within the combustion chamber of a cold engine, that produces the first explosion.

More Gaseous Mixture in Cylinder

The necessity, as explained above, for a temporary excess of fuel does not disapprove the efficacy of a definite mixture, but does emphasize the importance of complete vaporization.

The range of mixture quantity required by the average automobile engine, taking into account the relative volumetric efficiencies at low and high speeds, is usually not less than from one to twenty. That is, the velocity of the mixture in the intake manifold is twenty times as great at maximum speed, with throttle wide, as it is at idling speed, with throttle closed. How can it be expected that one-twentieth the maximum velocity will carry in suspension the same weight of atomized fuel? This alone, although it is by no means the only factor, explains why it is that excess air is demanded at high speeds. The greater attrition of the rapidly moving air, passing surfaces wetted with unvaporized fuel, assists in vaporization, so that the *real gas content* of the mixture within the cylinder is, at least temporarily, greater than before and demands the additional supply of air which it requires.

Non-homogeneity of the mixture has been called upon to explain various erratic results, both in exhaust gas analysis and in actual engine performance. How can a mixture of atomized liquid particles, depending for their suspension upon widely varying velocities of the medium in which they are suspended, form a homogeneous mixture with a gas? On the other hand, what greater homogeneity can be secured from the diffusion of two gases and what more feasible method of promoting diffusion obtains than in the tortuous pasage from the carbureter to the combustion chamber?

It is beside my present purpose to amplify the many and complex details of the foregoing suggestions, or to propose at this time means for their ultimate accomplishment, but, instead, to reconcile, if possible, on some common grounds, the conflicting opinions of the trained observers as expressed in your columns. Without some such common grounds little progress may be expected in the advancement of carburetion toward the dignity of a science. Enough good work has been done to indicate efficient design, but to accomplish this no aspect of the subject must be neglected.—Arthur B. Browne, Consulting Engineer.

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Measurements No Problem—Duryea

Saginaw, Mich.—Editor The Automobile:—The inch system was in use in most parts of the world before the metric was foisted upon us and most mechanics can measure by either system without particular difficulty. A man having a metric micrometer can give the metric measurements of a piece made in inches just as perfectly as he could if it was made to metric size, and the maker of that part, although using inch measurements regularly, can fill the order just as exactly by the use of a metric micrometer. The present arrangement, therefore, presents no serious difficulty. We have tire makers who are supplying tires in metric sizes as well as in inch sizes, and the thing to be desired is not a common method of measurement, but the use of common sizes. It would be just as disadvantageous to a Brazilian to get a vehicle having an odd-size tire measured metrically as to get the same odd-size tire measured in inches; but it does make a big difference to the maker if he must for some fool reason, probably a legal one, change his machinery and his standards to meet the imaginary advantage. If you aim at the end you claim then it seems to me you will get this by standards of sizes rather than standards of measuring means.

The Crane Co., of Chicago, has been advocating metric measurements for modern pipe sizes. This would leave all tools, fittings, etc., just the same as they are at present, but their sizes would be expressed in a mouthful of metric mush instead of in our short, handy, simple English. I can see no gain in such a proposed change.

I have tried to look at this matter from the standpoint of practicability. I carry a tape line having metric marks on one side and inch marks on the other, and I find it much more convenient to use the large inches instead of the small centimeters and to use divisions into halves, quarters and eighths instead of into halves and tenths. I think that others find the same, and that in no place has the metric system driven out the inch measurements, except where the law enforced the change, and that the change there was a disadvantage rather than an advantage. It is easy to theorize on these matters, but theories cost money, and what we want is practical results. Our American makers had much better spend the money they would spend in making such a change in advertising in foreign countries where they can create a market for their goods whether made in inches or meters, and in their foreign catalogues published in foreign languages they can not only give inch measurements, which being stated in Arabic numerals are easy to read, but they can give equivalent metric measurements which will fully remove the objection you mention.—Charles E. Duryea.—Duryea Motor Co.

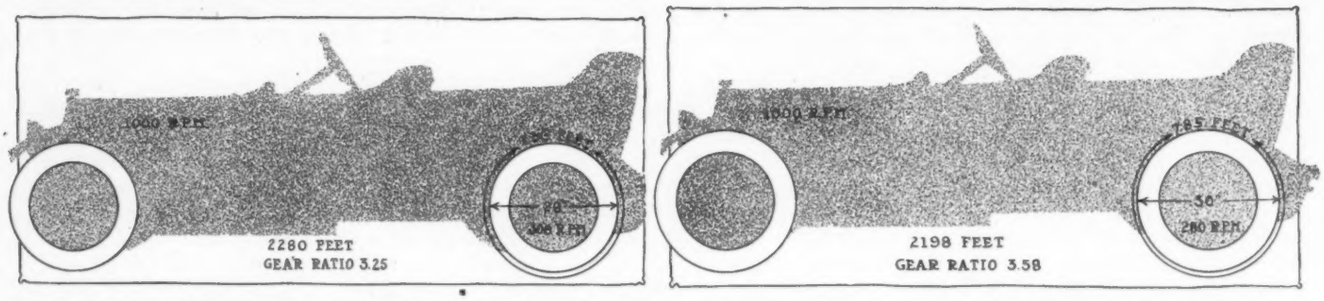

Fig. 1—Comparison of two cars, showing what each would do with the same motor running at the same speed but through a different gear ratio and through different size tires. At the end of 1,000 motor revolutions one car will have traveled 2,280 feet, while the other will have gone 2,198

Two-In-One Brake Pedal Suggested—How Show Spaces Are Chosen—Oversize Tires Discussed—Effect of Gear Ratio on Pulling Power—Different Size Tires on Rear Wheels—Thermo-Syphon Circulation—Tire Pressure

Suggests Divided Brake Pedal

EDITOR THE AUTOMOBILE:—In the March 13 issue, in a reply to R. R. Saulpaugh's differential query, you state, "In turning a corner more power is exerted for the outside rear wheel." It seems to me, that this would bear a discussion. Suppose we had a car of 60-inch tread making a right angle turn of a radius of 25 feet, the inner wheel would travel a distance of 39.2 feet, the outer wheel 43.1, 3.9 feet farther, roughly speaking 10 per cent. farther. Now if we had a pair of balances with 10 pounds in each pan and the scales were lifted by the central support, both weights would sum up evenly but now if we wanted 1 pan to lift .1 faster than the other, we would have to shift the central support toward the slower moving pan, or else add weight to it. The added weight would vary according to the weights in the pan, and the speed at which they were lifted. If we had a turning power of 100 pounds on the differential 50 pounds would be distributed to each rear wheel by the compensating wheels of the differentials, the speed turning a corner varies .1 the leverage, or 10 pounds, 5 pounds added to the inner rear wheel, make 55 and 5 taken from the outer reduces it to 45 pounds, or in other words (the front wheels being at an angle to the line of the rear wheel, the force of the inner rear wheel is delivered crosswise of the front wheels) there is 10 pounds of the engine force being exerted to make the front wheels skid, causing an increased wear of tires. Now if we had a divided brake pedal so that a small side shift of the foot would brake either rear wheel as desired, a braking strain of 10 pounds on the inner wheel would prevent the inner wheel from pushing this much force against the ground and the car would go around on an even keel, or a slight increase of brakes would make a slight drag on the inner wheel and assist in pulling the front end around. This would be a great advantage on a car but I suppose the makers will not add it until users get wise to it and demand it. It would be a great thing on a bad road where one rear wheel slips into a mud hole and spins around; slightly braking it, would give the other wheel a chance to pull out. A racing car so equipped could turn a corner with higher speed and greater safety making a great gain in time.

Brandenville, Pa. Jos. MUNDEN.

Lots Drawn for Show Spaces

Editor THE AUTOMOBILE:—What plan is followed in allotting space to different car manufacturers at the New York and Chicago shows? It seems there would be much rivalry for the choice of positions.

Oakland, Ia. F. W. P.

—Show spaces are allotted by a double system of drawing which cannot help but be fair. The manufacturers are first classified according to output. They are divided into definite classes in this manner and then the buildings in which the show is to be held are divided so that the most prominent floors are given to the first class, the next prominent to the second class, etc. These floors are divided into spaces. If there are 100 in the first class, 100 numbers are put in one hat and 100 names put in another hat. Simultaneously a number and a name are drawn from these two hats by different people and this determines the order of choice. For instance if the name Packard were drawn from the hat at the same time as the number 6, Packard would have sixth choice. In this way each of the members of each class secure their spaces

Merits of Oversize Tires

Editor THE AUTOMOBILE:—I have a 1911 Cadillac equipped with 34-4 tires. Oversize tires have been recommended. Would you advise using them, as my car is rather heavy I read something once about oversize tires giving some trouble as the item inferred that they were more difficult to fit. Is this so; what is the reason for it? I have heard that an oversize tire would not keep its seat, but that it tends to creep.

If a 34-4 tire costs $40 and an oversize $52, it seems to me that one-quarter extra mileage would be required out of the higher-priced shoe to give equal returns on the investment. This would mean about 3,750 miles on an oversize against a straight 3,000 on a 34-4. Is the larger shoe likely to run that much longer without showing any more wear than the smaller shoe? If the increased cost of the inner tube is considered it seems to me that an oversize would have to make 4,000 miles to give equal service. I should welcome a discussion on this matter, as I had about

made up my mind to change to larger shoes. Yet I want to look before I leap.

New York City. J. D. MARTIN.

—Experts of the tire world have unqualifiedly recommended the oversize tire for cars which seem to be too heavy and which cause a too rapid deterioration of the shoe. On the face of it, this appears to be true, but there is another side to the question. A close examination of the shoe should be made to determine whether it is wearing out through cutting or through the actual wearing away of the surface of the tread. In and around New York City where the automobilist not infrequently encounters glass-strewn streets, which occur so unexpectedly that he is compelled to run over a large section of fractured milk bottle or other glass, nails, tacks, etc., it will be found that the majority of tires wear not through the grinding off of the surface, but through large cuts which cannot be repaired or numerous small cuts which allow moisture to penetrate and rot the fabric or sand to distort the casing and to rip the tread from the body of the tire.

In New England, on the other hand, where the tourist finds that most of the running is confined to country roads of the dirt variety, the chances are much more in favor of the tire having worn in the regular manner; that is, by the wearing off of the tread.

Now it is a certainty that a large tire will cut just as quickly and will deteriorate just as rapidly as will one of the small size. Therefore if your tires are discarded on account of cuts it would not seem to be economical to use the larger shoe.

Assuming that your tire wears from the surface, the oversize tire will be more economical. In the first place, blowouts will be cut down 100 per cent., hence inner tubes will last longer. In the second place, what applies to a beam in a building also applies to a tire. If a beam be used which will just support a given weight, that beam will have to be renewed many times sooner than would be a beam which had a margin of safety of exceptional amount. Or, again, consider the parallel with an engine bearing: a bearing which is of just sufficient size to carry the load put upon it by the crankshaft safely will have to be renewed three times as compared to a bearing which has a factor of safety of 60 or 70 per cent. The load at which a tire is capable increases rapidly with the diameter of the tire, hence you are giving yourself an enormous factor of safety by using the oversized tire.

The entire situation may be summed up by stating that if your tires are actually wearing out and not being cut to pieces you will find it more economical to use the oversize.

Pulling Power Through Gear Ratio

Editor THE AUTOMOBILE:—Will you kindly advise me which car has the greater pulling qualities, one with a gear ratio of 3.25 to 1 with 28-inch wheels or one with gear ratio of 3.58 to 1 with 30-inch wheels.

Calcite, Col. C. P. HINDS.

—Your question may be best answered by a study of the accompanying diagram, Fig. 2. Assume that the motor develops a given horsepower of 1000 revolutions per minute. Taking the first case which you mention, that in which the gear ratio is 3.25:1 and the wheels 28 inches in diameter, it will be noted that at this engine speed the rear wheel is revolving at the rate of 308 complete revolutions per minute. A wheel whose diameter is 28 inches covers 7.36 inches, neglecting slip, in one revolution. In 308 revolutions it will have gone 2,280 feet.

Bearing the above figures in mind, consider the second instance with the same motor developing the same power at 1,000 revolutions per minute with the gear ratio of 3.58:1 and the rear wheel turning at the rate of 280 revolutions per minute, the distance traversed by the rear wheel would be 2,198 feet. The circumference of the 30-inch wheel measures 7.85 feet.

It is evident that the car first mentioned would be traveling faster for any given motor speed, but the second car, being geared lower, would be able to take a correspondingly steeper hill without a change of gear. For each revolution of the motor the car first considered would travel 2.28 feet against the 2.20 feet of the second car. Or it would gain .08 feet per motor revolution. Assuming the first car to be traveling 30 miles an hour, the second car would be traveling 32.4 miles an hour. In this same ratio as the speeds the amount of resistance will be found to vary inversely. If a stretch of sand interposed just sufficient resistance to cause the first car to change gears, the second car would be able to pass through it with an 8 per cent. margin of strength.

Automobile Companies Maintain Schools

Editor THE AUTOMOBILE:—What automobile companies have schools of instruction such as that of the Cadillac company and how is admission to such schools secured?

Six Mile Run, Pa. OSCAR DAVIS.

—The Cadillac company maintains a school which is unique in that it trains engineers to be employed by the Cadillac concern and pays them a nominal wage during this time. The requirements for entrance are merely upon recommendation of some recognized authority. The payment at the school is just sufficient to maintain the living expenses of the students while there. Other large concerns, as Pierce, Packard, etc., have schools of instruction in driving for the owners of the cars. Packard maintains a school for its own employees. A local agent or branch manager can recommend a man for the school with the understanding that he shall be trained in the manufacture of the automobile and also secure a training in the selling end of the business.

Different Tires on Rear Wheels

Editor THE AUTOMOBILE:—Is it possible in case of an emergency to run with a 36-inch tire on one of the rear wheels and a 37-inch tire on the other? Would the differential overcome this difference of tire size? Do you think the difference would be noticed by anyone riding in the car? I have been told that this would be hard on the motor and rest of car, Is this true?

La Crosse, Wis. A. WERNER.

—It is very possible in case of emergency to run with a 37-inch tire on one wheel and a 36-inch tire on the other. What would happen is set forth diagrammatically in Fig. 2. While one wheel is making 1.07 revolutions the other would be revolving 1.05 times. The amount of power absorbed by each wheel would be directly proportional to the effort it was exerting in driving the car. This effort is proportional to two things, first, the work carried by the wheel, and, second, the peripheral speed of the wheel. The weight carried by each of the wheels would be so nearly the same that for all practical purposes we may consider it equal. It is evident that in proceeding a distance of 9.69 feet while carrying a weight W against a coefficient of tractive effort T, 9.69 WT foot-pounds of work will have been accomplished. During this time the other wheel will have 9.42 WT′ foot-pounds of work. Assuming the factors T and T′ to be equal it is evident that the work done by each wheel will be

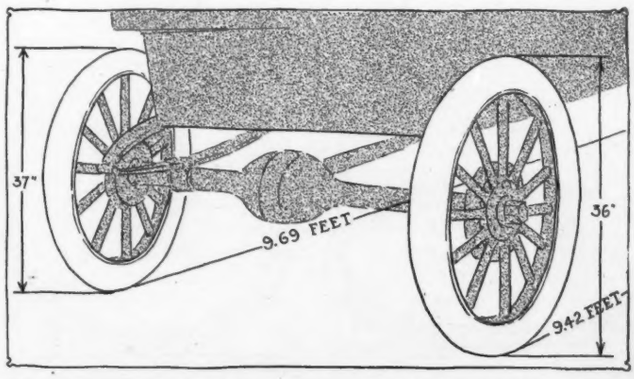

Fig. 2—Diagram showing the travel per revolution and the effect on the car of different size tires on the rear wheels

exactly proportional to the factors 9.69 and 9.42. The action of the differential in allowing one wheel to turn more rapidly than the other would not harm it or the car in any way as that is the exact purpose for which the differential is intended, namely, to permit different peripheral speed for each of the rear wheels. The only detrimental feature that you would have to work against would be the unsymmetrical appearance of the car and the fact that one tire, the smaller, would probably wear much more rapidly than the other.

Circulating System on Overland

Editor THE AUTOMOBILE:—Should the water in an Overland 21 fail to circulate under all conditions, say, 10 degrees above zero or colder, if not frozen up? At the service stations they say this will happen if the lower half of the radiator is not covered to protect the motor without its being frozen or clogged otherwise.

Lorain, O. J. A. K.

—The water is circulated in an Overland car by the thermo-syphon process. The water in the jackets surrounding the cylinders becomes heated by the temperature of combustion and in the same manner as the water in a pot tends to circulate, the warmer water has a tendency to rise. If you will observe the action of the water placed on the stove, you will note that as soon as the temperature rises there is a tendency for the water at the bottom of the pot to rise to the top being displaced by the cooler water above. It is the same in the thermo-syphon system of cooling. The water-jackets, manifolds and radiator are filled with water. When the temperature of the water in the jackets rises sufficiently for it to become much lighter than the water above it in the outlet manifold it tends to rise to this manifold and to be displaced by the water which enters from the intake manifold. A natural current is thus set up which becomes more rapid as the water becomes warmer and when a high temperature is reached the water in the jackets is often converted into low-pressure steam which accelerates the thermo-syphon system to a marked degree.

When the water in the bottom of the radiator becomes intensely cold it tends to form a break in the system for the following reason: It will be noted in Fig. 5, which is a diagrammatic view of the Overland system, that the water flowing from the radiator to the cylinders must first rise through a small section of pipe P. When the water is exceptionally cold it is evident that it would take considerable pressure for the water above to force this through, but owing to climatic conditions the water in the radiator may be chilled so rapidly that it is unable to displace the pocket below the pipe P. For this reason the lower section of the radiator should be covered in cold weather. After a time the water surrounding the jackets would become so hot that the pressure of the steam formed would be sufficient to blow the water in the pocket up into the jackets. In an extreme case the pressure in the jackets would hold the water from entering either at the inlet or outlet, but this would only be likely to happen in case the system was clogged and had not been given proper care. As a general rule, it may be stated that the water would circulate even if the radiator were left uncovered, but that this circulation would not be as efficient as if the radiator were covered.

It must be remembered that the effect of keeping the radiator covered in a thermo-syphon system is much different than when keeping the radiator covered in a pump circulating system. In the latter the water is circulated at a uniform rate regardless of the outside temperature. The amount that the water is cooled in passing through the radiator depends to a large extent on temperature of the outside atmosphere. When the water is cooled sufficiently in warm weather it is evident that it will be cooled more than enough in cold weather. The gasoline motor works most efficiently at high temperatures. The reason for this is that the heat which would be thrown off through the cooling water at low radiator temperatures is converted into useful work at higher radiator temperature. The water surrounding the jacket in a pump circulated system attains very nearly the same temperature in winter or summer. But when the radiator cools it to a marked degree it is necessary that energy in the form of heat be lost when raising the water to the fixed jacket temperature. For this reason the cold motor is inefficient and it means an actual saving in the money spent for fuel for the owner to protect the radiator in cold weather. At extremely low temperature it is not only necessary to cover the radiator, but also to spread the covering over the entire bonnet.

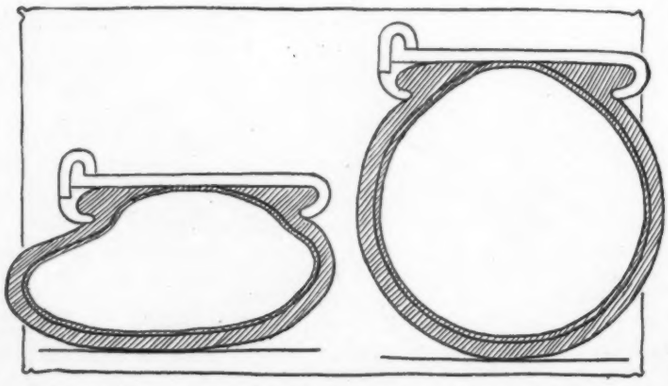

Fig. 3—Showing how the weight of the car on a deflated tire decreases the internal volume

Pressure Due to Car Weight

Editor THE AUTOMOBILE:—Is the pressure or strain on a tire, that is pumped up to ordinary pressure, relieved to any extent by removing the weight of the body from it? As long as a tire is kept up to ordinaray pressure, does jacking it off the floor relieve the strain on it to any extent? Is it any easier to pump a tire with the wheel jacked up than it is with the weight of the car on the tire? If there is any difference what causes it?

Rochester, N. Y. M. B.

—The pressure in a tire is greater when the car rests upon it than when a car is jacked up. If you take a rubber ball filled with air and stand upon it the pressure in that rubber ball will be greater than if you held the ball in your hand without squeezing it. This latter instance is parallel to that of a car in which the tires are relieved of the weight. If you have a given quantity of air, the smaller the volume in which you put that air the greater the pressure which will be exerted by the air. In the tire there is a definite amount of air. The pressure of this air varies

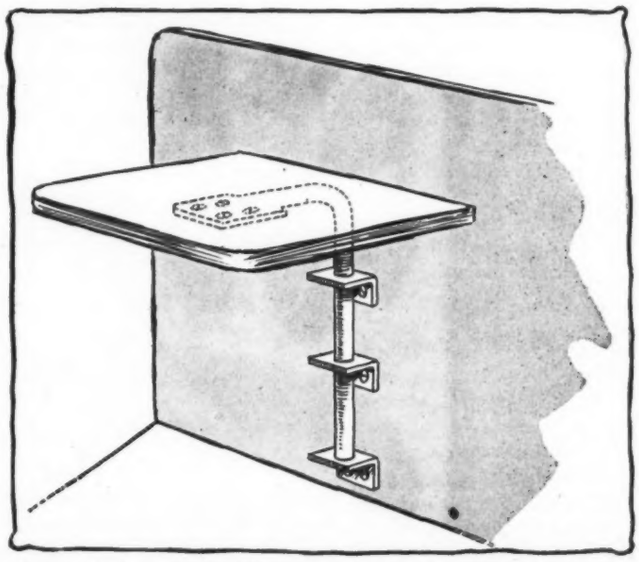

Fig. 4—Method of attaching removable home-made seat for child. Bracket is tapered or stepped

inversely with the volume it occupies. When the tire is round the air is at its maximum volume and hence its minimum pressure. When the weight of the car is on the tire it is no longer round and the volume is reduced as illustrated in Fig. 3. Therefore, the pressure in the tire is greater when it carries the weight of the car.

If there were any doubt upon the above statements it would be removed by the following thought: The pressure exerted by the air must carry the weight of the car. If it did not the car would rest flat upon the ground and not upon a cushion of air. The weight of the car flattens a tire until the pressure within that tire becomes high enough to carry the weight of the car and no more. The more air that is in the tire the less the volume within the tire has to be decreased to bring the pressure to the amount necessary to hold the car. Hence the more air that is in a tire the less it will flatten out under the weight of the car. Jacking up the car relieves the total pressure within the four tires to the amount of the weight of the car. Since it is

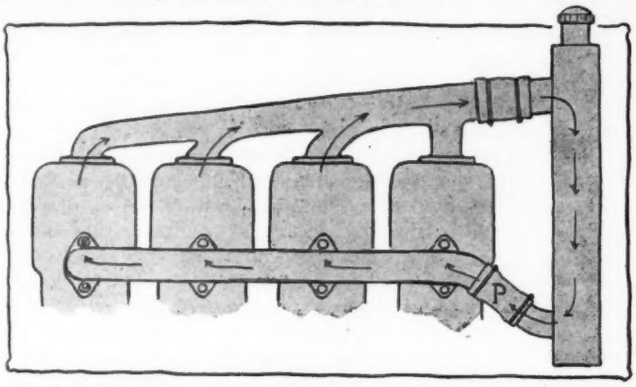

Fig. 5—Diagram of the thermo-syphon system used on the Overland car—Water circulated without aid of pump

harder to pump against a higher pressure than a lower one it is harder to pump the tire when it is resting upon the ground than when it is jacked up; provided that the pressure is only raised to such an amount that the tire will be at the desired pressure with the car resting upon the ground.

Few Pressed Gears Used

Editor THE AUTOMOBILE:—Having overheard a discussion a short time ago relative to the difference between a cut gear and a pressed gear, I am writing to get some information of your opinion of same. I am at a loss to know just what a pressed gear is, and would appreciate your opinion which is more efficient of the two gears and also your definition of the pressed gear.

Philadelphia, Pa. H. C. H.

—By pressed gears you doubtless refer to gears made by die-casting or drop-forging processes. A few of these gears are made by scattered concerns but many of these are gradually dropping the manufacture as it is of course impossible to make them as accurately or as well as by the cutting process generally used. If made in large quanities for light work such as in hand ice cream freezers, etc., they are sufficiently accurate and can be made very cheaply. They cannot compete with the regular machine-made gear.

Child's Seat in Runabout

Editor THE AUTOMOBILE:—I have a Buick runabout Model 30 and I want to get a seat suitable for a child, same to be placed in front of the passenger. Do you know of any manufacturer from whom I could get this seat?

St. John, N. B. A. L. F.

—Supplementary seats are manufactured by the following concerns:

Amesbury Brass & Foundry Co., Amesbury, Mass.
C. A. Buffington & Co., Berkshire, N. Y.

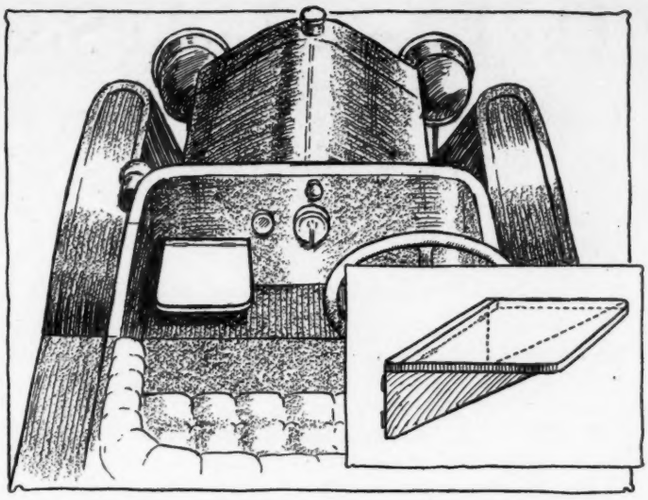

Fig. 6—Small folding seat used for a child—Can be made at home and with good wood is sightly

Empire Gear & Top Co., 207 W. 22d St., Philadelphia, Pa.
Eureka Seat Co., 407 Rhode Island Ave., Buffalo, N. Y.
Glendale Mfg. Co., 152 W. 34th St., New York, N. Y.
Hill Mfg. Co., 28 Fuller St., Buffalo, N. Y.
Hodge & Graves Co., Amesbury, Mass.
Hume Carriage Co., 1000 Commonwealth Ave., Boston, Mass.
C. P. Kimball & Co., 39th St. and Michigan Ave., Chicago, Ill.
McKinnon Dash Co., 252 Amherst St., Buffalo, N. Y.
Metal Stamping Co., 13th St. and Boulevard, Long Island City, N. Y.
Polson Mfg. Co., 27 Chenango St., Buffalo, N. Y.

You can if you desire, make your own seat. Two methods are suggested in Figs. 4 and 6. If the weight of the child is not excessive this will serve your purpose about as well as a supplementary seat made by a regular manufacturer. The first method consists of a fold down seat which is fastened to the dash in the manner shown in Fig. 6, with a hinged bracket and also a hinge in the seat; when the seat, it is simply folded up and the brackets swung into place. When not desired it takes up practically no room and if made of walnut or mahogany or covered with leather it will present a very neat appearance. The seat could also be made on a permanent bracket as shown in Fig. 4 and then when required could simply be inserted into the socket clamped on the dash. Where the weight of the child is excessive it would be better to have some sort of seat in which the weight was carried by the floor rather than by the dash.

Timing of Exhaust Valves

Editor THE AUTOMOBILE:—Please tell me the timing of exhaust valves of American Napier runabout of the Niche type made in the year 1905. The valves have no adjustments and are worn down so badly I want to draw them out a little as I do not seem to be getting as much power as I should. The inlet valves are of the automatic three-in-one type.

—The exhaust valve opens about 7 degrees before lower dead center and closes from 0 to 5 degrees after upper dead center.

Morristown, N. J. HARRY FORD.

Please Sign Your Inquiries

[THE EDITOR OF THIS DEPARTMENT is in receipt of several letters signed Reader, Subscriber and by initials. No attention will be paid to anonymous or unsigned letters; readers who wish to make use of these columns must sign their letters as an evidence of good faith. No names will be published if the writer of the inquiry or communication does not wish the name to appear. It is only necessary to state this in your letter. Other letters which have not been deemed of sufficient general interest to publish in these columns have arrived without the sender's address so that it is impossible to answer them by mail. We are delighted to have our subscribers use these columns and most cordially invite correspondence, insisting only on the rules just mentioned.—EDITOR.]

The Lozier Light Six

Type 77 Has Unit Power Plant of 36 Horsepower—Electric Starting and Lighting Features

Cylinders in Threes—Left Steer and Center Control—Valves Have Cast Iron Heads and Steel Stems

ALTHOUGH adhering to many of the former Lozier characteristics, the light six, or type 77, is radically different in many respects. Principal among the changes is the motor. Like the big car, the light six, which, by the way, is so called to distinguish it from a little six, has a unit power plant. But its cylinders are of the L-head type, cast in blocks of three.

The new type motor develops 50 horsepower, although its cylinder dimensions of 3.625 by 5.5 inches are responsible for the rating of 36 horsepower. This bore and stroke give a true long-stroke motor, the ratio being 1.52.

Inlet and exhaust valves are on the right, the design of the manifolds being such that there is a separate connection to each cylinder, as shown in the motor view, Fig. 5. Cover plates completely inclose valve springs and stems to the exclusion of all foreign matter. Valves are made with cast-iron heads and carbon-steel stems, the two parts being fused together. The idea of this construction is that valves so constructed show a tendency toward uniformity of wear and less liability of pitting.

Taper Valve Springs

Valve lifters are of rocker form, the Lozier engineers believing this type to be somewhat quieter than the ordinary straight-lifting type. Valve stems are provided with check nuts which make for easy adjustment. The springs are tapered and constructed from tempered steel wire. The reason advanced for the use of taper springs being that they permit of truer valve seating than do straight springs and prevent uneven valve stem wear.

The crankshaft construction is also new to Lozier design. There are three main plain bearings and three throws. It is a drop forging, the flywheel flange being integral.

Pistons of gun iron are fitted with four rings, three above the wristpin and one below. The rings are of the concentric design, the lower one acting as an oil ring to prevent the lubricant from working up into the combustion chamber. Oil grooves are cut in the piston faces to aid in the even distribution of the cylinder oil.

The camshaft, a view of which is shown herewith, Fig. 1, is a heat-treated drop forging, cams being forged integral with the shaft. It is easily removable through the front of the crankcase. Timing gears are helically cut.

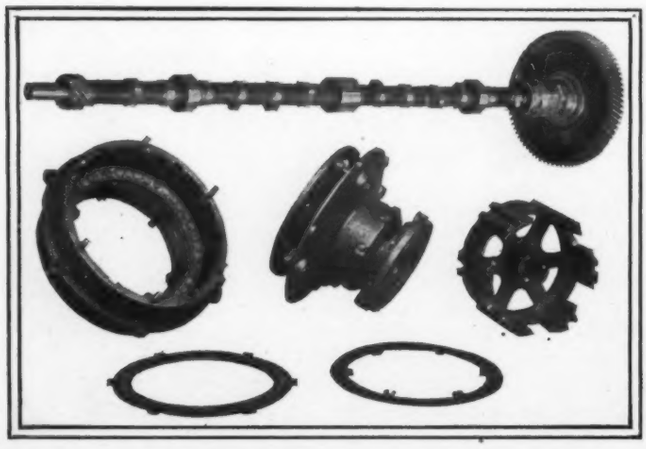

Fig. 1—Camshaft and clutch details of Lozier light six

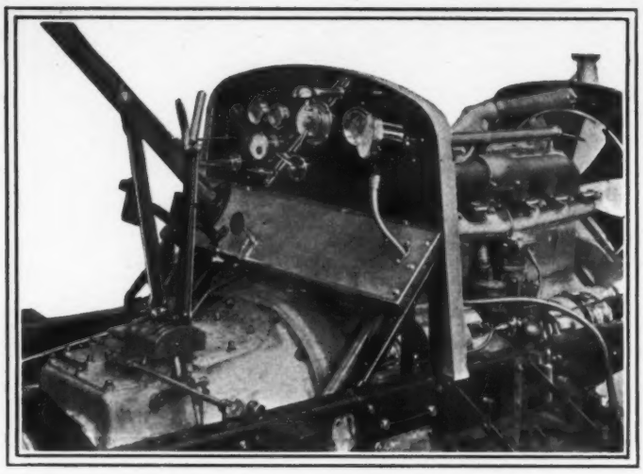

Fig. 2—Dashboard and unit power plant of latest Lozier

The crankcase construction is worthy of special note. Cylinders are bolted to a rectangular base of aluminum which forms the upper half of the crankcase and which fills up the entire space between the motor and the side-frame members, affording a mounting for magneto, lighting generator, etc.

Lubrication of the motor is by a combination system making use of a force-feed-splash-gravity arrangement. A gear-driven oil pump, located in the rear of the engine base forces the oil from the oil sump to the main crankshaft bearings, the main lead from this pump passing to a dash gauge and thence to the point of circulation. Leads run from this main passage to the crankshaft bearings, the surplus oil flowing by gravity down into the individual troughs under the connecting-rods. The caps of the connecting-rods are provided with small integral dippers which plunge into these troughs as they revolve, splashing the lubricant in the conventional way up into the cylinders, lubricating the connecting-rod bearings, piston and cylinder walls. In thus flowing back the oil is drained through a series of fine-mesh screens. Leads from the main oil passage beyond the sight feed also carry the lubricant to the camshaft bearings, magneto, pump and front end gears. It is stated that a gallon of oil is sufficient to cover from 400 to 450 miles under ordinary conditions.

The radiator is of the horizontal, square-tube type, with tubes 3 1-2 inches deep, affording an unusually large radiating surface. The cooling fan has a diameter of 18 inches, and located conventionally between cylinders and radiator, is driven by a canvas belt .25 inch in width.

A Bosch high-tension magneto in connection with the dual system, the other source of ignition being a storage battery, is used on the new type 77. One set of spark-plugs is used, being inserted directly over the inlet valve. The magneto is placed on the left side of the engine base just back of the pump, its shaft being driven by an extension of the pump shaft.

Automatic Gasoline Tank Pressure

As on the larger car, the gasoline tank is suspended at the rear of the frame. It has a capacity of 20 gallons and fuel is fed from it by pressure, the air being supplied automatically by a positive-plunger pump arranged in one of the valve lifters. The pressure is regulated by a blow-off valve at the top of the check valve mechanism on the side of the lifter. An auxiliary hand pump is provided on the footboard of the car. A pressure gauge on the dash indicates the pressure in the tank, while another gauge fitted to the tank shows the amount of fuel contained.

The new car is equipped with a Gray & Davis electric starting and lighting system. It is entirely independent of the ignition

system. The lighting generator and the motor which is used for starting are entirely separate units, both being located on the right side of the engine, as shown in the illustration. The generator is placed just back of the fan driving pulley and is gear driven by means of an extension of the fan driving shaft. The generator produces at the rate of 12 amperes when the car is traveling at a speed of 15 miles an hour. This speed is about that maintained in ordinary city driving and is sufficient to keep the battery fully charged at all times. The battery has a capacity of 120 ampere-hours and its voltage is 6.

Operation of Starter

The starting motor gear meshes with teeth cut in the periphery of the flywheel on performing its starting duty, the starter pedal being located in the floorboard.

A slight pressure on the pedal permits a small amount of current to pass through the armature of the starting motor, turning it very slowly and at the same time connecting the motor gear with the flywheel. When the starter pedal has been pressed down to its extreme position a switch is thrown, thus sending the full current from the battery to the electric motor turning the crankshaft over at about 100 revolutions a minute. When the engine starts under its own power the starter pedal is released, springs then sliding the starter pinion out of mesh and breaking the connection between storage battery and motor.

The multiple-disk clutch is somewhat different from that of the other Lozier product in that alternate disks are fitted with cork inserts.

The transmission gearset is selective, three speeds forward and reverse, direct on third and when furnished in standard designs has a ratio of 3.75 to 1 on high. Following is the reduction for the different speeds:

First	9.97 to 1
Second	6.07 to 1
Third	3.75 to 1

The rear axle receives its power through a substantial shaft which is entirely inclosed in a torque tube, as in former Lozier construction. The front end of the torque tube bolts to a cross-member of the frame through a substantial spider. A new feature of this construction is the swiveling of this cross-piece at either end where it joins the side rails of the frame. This freedom of movement allows for differences in the relative height of the frame and the rear axle to the housing of which the torque tube bolts through a flange. Unevenness of road surface raising one wheel higher than the other and thus bringing the rear axle out of its normal plane is allowed through a moving connection at the rear of the spider where it joins the torque tube proper. The tube is braced by rods which run diagonally from its front end to the axle.

The differential gears are cut from alloy steel as are the beveled driving gears and pinion. They are fitted with adjustable thrust bearings so that a perfect relation may be maintained between the two driving gears. The axle is of the floating type. The front axle is a drop forging of I-beam construction. The road clearance under the front axle, which is the minimum of the chassis, is 9.3 inches.

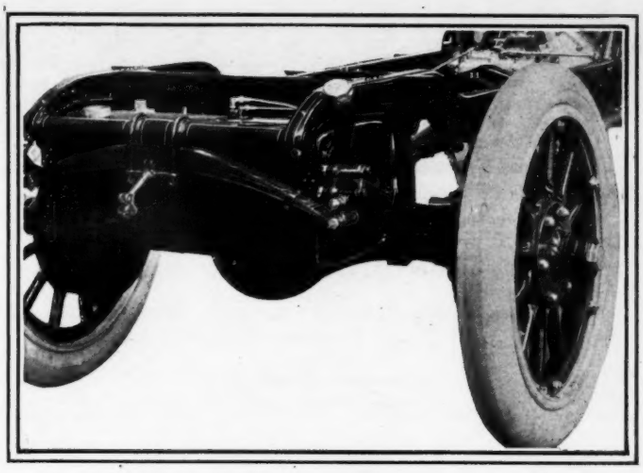

Fig. 3—Rear springs and suspension of gasoline tank

Former spring suspension obtains on the new six, in that half-elliptics are used in front and a platform system in the rear. Each rear spring is half-elliptic, the two side springs being mounted outside the frame.

Brakes are all internal expanding, 16 inches in diameter. The two brakes, foot and emergency, are placed side by side and operate on the same drum. The shoes are faced with a combination woven-wire and asbestos band .25 inch thick.

The wheels are fitted with demountable and quick detachable rims, carrying 35 by 4.5-inch tires all around. All wheels are mounted on annular ball bearings.

Turns in 38-foot Circle

The Lozier company places its steering wheel on the left, while the brake lever and change-gear lever are in the center. The car requires a circle of 38 feet in diameter in which to turn.

All bodies are mounted on the standard chassis. The types are five in number and include the Montclair model five-passenger touring car, the Fairmount two-passenger roadster, the Metropolitan five-passenger fully inclosed limousine, the Coronado six-passenger, four-door limousine and the Touraine three-passenger coupé.

Running boards are entirely clear, the spare tires being carried in the rear, while tool boxes are fitted in specially designed aluminum compartments in the aprons between the running boards and the frames. The windshield in the open models is specially designed for the car and forms a part of the body.

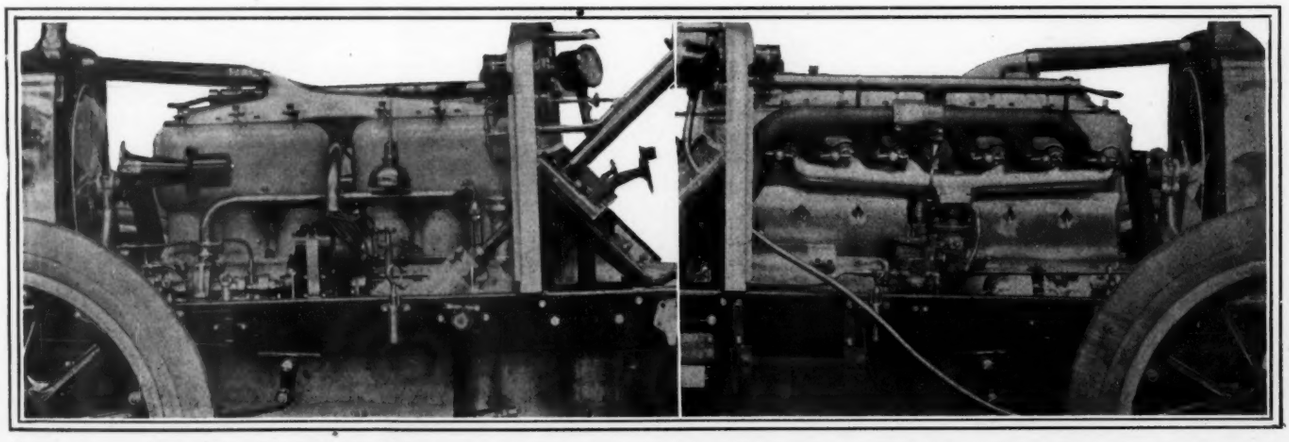

Fig. 4—Left side of motor, showing pump connection Fig. 5—Arrangement of manifolds on right side

The Automobile

Vol. XXVIII Thursday, April 3, 1913 No. 14

THE CLASS JOURNAL COMPANY
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To Subscribers—Do not send money by ordinary mail. Remit by Draft, Post-Office or Express Money Order, or Register your letter.

Entered at New York, N. Y., as second-class matter.
The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903 and the Automobile Magazine (monthly), July, 1907.

Car Builders and Batteries

BATTERY makers have just cause for complaint against a great many car manufacturers. It is true that in the main the cars of today have been perfected to a wonderful degree, but there are still a great many details which are not given the attention they deserve by the men who build the car. One of these, and a very important one, is the storage battery.

Every car builder should furnish the purchasers of his product with instructions on the care of the storage battery which comes with the car. These instructions should be brief and very simple. It does not require a twenty-page booklet to impart the necessary information.

Every car builder should see that the battery is readily accessible. Too often it is placed under a seat or mounted under the car in such a way that it may not be reached without getting under the car. Every car owner should be instructed to inspect his battery regularly and provision should be made for facilitating such inspection.

It has been stated that practically 95 per cent. of electric self-starter troubles are due to the owners' ignorance regarding the care of the battery. From this it may be seen that it is up to the car manufacturer to remedy this condition of affairs.

The practice of giving demonstrations of the power of self-starters by running the car on the starter should be vigorously discouraged by both makers and dealers. It imposes an excessive strain on the starting mechanism and also impairs the battery.

Adequate Lubrication

SEVERAL comprehensive tests of gasoline motors made within the last 2 years in Germany, France and England have demonstrated the necessity for additional lubrication during continued operations at full loads when the size of the motor exceeds a certain limit.

Some of the comprehensive tests made by Dr. Riedler in his German laboratory have gone far to demonstrate that when a motor has a bore exceeding 85 millimeters it is necessary to furnish additional lubrication to that regularly given when the motor is working continuously at its full load or with a possible overload.

On the other hand, Dr. Riedler's reports have shown that with motors under this size not only is this additional lubrication unnecessary but that the motor efficiency per volume of displacement is greater. His tests demonstrated that there is a continual increase in efficiency from the fuel consumed as the motor size is reduced from 100 millimeters to 80 or lower.

Dr. Riedler's results are highly interesting in view of the present tendency towards smaller motors on the American market, and also because of the longer strokes being used. There is a rapidly developing feeling in America that smaller motors will serve for our present-day cars, a fact, to an extent, due to improved roads as compared with 4 or 5 years ago.

European makers are busily engaged for 1914 on improvements in lubrication of the motor, and in nearly every case efforts are being expended to regulate the oil flow in accordance with the work done, and to increase the oil flow in a high ratio as the speed of the motor increases. To do this the foreigner is increasing his pressures slightly over that of 1913, and is more and more getting away from splash lubrication and using only pressure.

A good example of the necessity of extra lubrication for motors operating at continued high speeds was found in the most successful racing cars in Europe a year ago, when the pressure feed to the bearings was more than ten times that used on stock passenger cars. With this vastly increased lubrication there was a perceptible looseness in the fittings of the bearings, these being so loose in the crankshaft and connecting-rods as to cause pounding if used for regular passenger-car service.

Most interesting results could be looked for by officially testing some of our larger motors on continuous high-speed work at the Indianapolis Speedway, where it would be possible to keep a constant over-load for long periods. The results of such tests, if covering a well-graduated series of motor sizes, would be most valuable, and it is to be hoped that some of our makers can be induced to co-operate in such a test.

Lubrication is yet far from perfection. Our present systems are generally adequate for normal road use in which rarely over 50 per cent. of our S. A. E. horsepower ratings is utilized in propelling the car on the highway within the legal speed limit, but as soon as special service is called for, extra provisions have to be made for lubrication.

Improved lubrication is necessary for another reason, namely, the introduction of block motors and also the present progress towards longer stroke types.

Motor Spirit Increases Horsepower

Comparative Test of 40-Horsepower Tractor Engine Shows 10 Per Cent. Increase in Power Developed on New Fuel—No Adjustments Necessary in Changing Over From Gasoline

DEVIL'S LAKE, N. D., March 28—Motor Spirit in a test made here recently proved that it would increase the power of a tractor engine by 10 per cent. over that obtained when gasoline is used as fuel. In a Case two-cylinder tractor engine rated by the factory at 40 horsepower, Motor Spirit developed 46.23 horsepower on the brake, while on gasoline, only 41.93 horsepower could be realized.

These tests were made March 13, by the Case School of Power Farming, with G. B. Gunlogson, M.E., as engineer in charge, assisted by representatives of the Standard Oil Co. and the Case company. The object of the tests was to determine the relative thermal value of Motor Spirit as compared with gasoline as fuel for internal combustion engines; to determine the relative maximum power of gasoline engines using Motor Spirit and gasoline; to determine the relative consumption of both fuels, to determine the changes and adjustments necessary in gasoline motors and carbureters for Motor Spirits and the flexibility in power and speed and the ease of starting the motor with Motor Spirit as compared with gasoline. Also, it was intended to discover the effect of the new fuel on the engine in the matter of heating, preignition, carbonization and fouling of the spark plugs.

A two-cylinder opposed Case tractor rated at 40 horsepower, with a normal speed of 450 revolutions per minute was used. This engine is equipped with a Rayfield model R T carbureter, and as the engine is opposed, the manifolds necessarily are unusually long. No provision was made to heat the intake air or the fuel before it was passed into the cylinders so that the best of results were not obtained owing to the cold weather which prevailed at the time of the tests.

Conditions therefore, were not ideal and this fact may have affected the comparative quantities of the test. This difference, however, can only be slight and would rather effect the showing of the engine than the object of the test. The fuels used in the test were Motor Spirit of about 52 degrees Beaumé gravity and ordinary commercial gasoline of 58 degrees gravity.

No Alterations Necessary

No adjustments were made in the motor in changing from one fuel to the other and the only necessary adjusting on the Rayfield carbureter was in raising needle valves slightly—about one and three-quarter turns and increasing the lift of the needle.

The results of the tests follow:

Test No.	R.P.M.	B.H.P.	Time, Minutes
On Gasoline			
1	487	42.31	10
2	481	42.10	12
3	466	41.37	15
Av.	478	41.93	12
On Motor Spirit			
1	491	46.48	15
2	491	45.60	15
3	473	46.60	12
Av.	485	46.23	14

Greater power for Motor Spirit as compared with gasoline, 10 per cent.

The engine behaved in every way as well when Motor Spirit was used as fuel; there was no noticeable difference in the running of the engine with the change in fuel after carbureter adjustments were made, except a slight amount of gray smoke from exhaust only occasionally. The comparative flexibility of motor with the different fuels was difficult to determine. The difference was slight, and owing to the cold weather could not be ascertained with any degree of certainty.

It was found that the cold weather affected the running of the engine in this respect. The engine when warm started equally well on both fuels but a cold engine which had been standing outside over night had to be primed with high test gasoline.

This also was the practice when the ordinary gasoline was used in the same engine, so little effort was made to start the cold engine on Motor Spirits. No difference in the temperature of the cooling water was perceptible with the change of fuels; the temperature was not ascertained accurately for either fuel, but did not exceed 180 deg. Fahrenheit.

There was no knock or preignition at any time with either fuel. The spark-plugs were removed after the first two tests on gasoline and also after the two tests on Motor Spirit were made, and it was found that slightly more carbon had accumulated on the plugs during the tests with Motor Spirit. This was in the form of soft soot and was almost imperceptible after these short tests.

The economy tests were not made at this time but will be made at Grand Forks, N. D., in a few weeks and very extensive economy tests will be made at that time.

Oil Trade Competition Growing

NEW YORK CITY, March 28—An address by G. D. Chamberlin, counsel for the National Petroleum Association, read before the German Reichstag in connection with the illuminating-gas bill before that house, gives some interesting information on the present status of the petroleum industry.

According to the address, the entire refining capacity of plants operated by the former oil trust amounts to no more than 80,000,000 barrels a year, while the independent refineries have a capacity of over 63,000,000. The latter number 125. The ratio between Standard and Independent oil refineries is, at present, according to the above figures, 56 and 44 per cent., respectively. In 1904 the ratio was 85 to 15, and as in 1911 the total number of refining plants was almost twice that of 1905, it becomes obvious that during that period they have grown 600 per cent.

The entire oil consumption in Germany for the purpose of illumination is about 6,000,000 barrels a year and of this 5,000,000 are imported from the United States. As soon as the bill now under consideration in the Reichstag was formulated, the independent refineries were informed of the opportunity of breaking into the German market and an inquiry was made as to the possibility of supplying the above-outlined oil demand of the Empire. The result is that the independent producers are now able to supply to Germany 5,400,000 barrels a year, which could probably be made to suffice the demand.

The address, in an appendix, shows that during 1911 the world production of crude oil was 345,512,185 barrels of 42 gallons, an increase of 24,712,041 barrels over the previous year. Of the total production, 63.80 per cent. or 220,449,391 barrels were produced in the United States and 19.16 per cent. or 66,183,691 barrels in Russia, while no other country contributed as much as 5 per cent. of the total, although there were about another dozen oil-producing countries.

Upper—Majola car in the recent Tour de France on the road between Nice and Avignon. The illustration gives an idea of some of the scenery along the route followed by the tour

Lower—Duray driving his Metallurgique along the road between Nice and Avignon, a short distance from the scene depicted above

Nine Cars Are Perfect in Tour de France

Seven Others Finished 2,880-Mile Run with Penalizations—Remaining Twelve Fail to Finish

¶ The entrants finishing with perfect scores are: Buick; Aries; Corre La Licorne; Anasagasti (two cars); Metallurgique; Barré; Majola, and Picrron. An Alcyon lost 2 points, a Hurtu and a Bozier each lost 3 points, and an Aries, a Corre La Licorne, S. C. A. P. and Pierron finished with 4 points penalization. The trip was made in 15 days, including 12 running days and 3 days of exhibition at important centers.

PARIS, FRANCE, March 18—Out of twenty-eight cars to start in the Tour de France 2,680 miles sealed bonnet reliability test, nine came home with clean scores, seven finished with penalizations and twelve fell by the roadside. The clean scorers are Buick, Aries, Corre La Licorne Anasagasti (two machines), Metallurgique, Barré, Majola, Pierron. In addition, an Alcyon finished with the loss of 2 points, a Hurtu and a Bozier with 3 points each, and A ries, Corre La Licorne, S. C. A. P. and Pierron with 4 points each.

This competition was a new one for France. The organizers wished to prove that a modern light car with a chassis price not exceeding $1,600 could make a complete circle around France, taking in the Alps and the Pyrenees, with no more attention than 10 minutes each morning for oiling and slight adjustments. For this purpose all the essential parts of the cars were permanently sealed, the loss of one of these seals entailing disqualification, and the toe boards, underpan, bonnet and radiator filler cap had seals which could be broken every morning for 10 minutes only. If these seals were touched during the run, points were lost, the penalty being 2 points for a radiator filler cap, 3 for toe boards and under pan, and 4 for the bonnet.

The trip had to be made in 15 days, this including 12 running days, when the mileage varied from 190 to 254, and 3 days given up to public exhibitions in important centers. These exhibitions gave the drivers a rest and enabled the salesmen who accompanied the tour to convince the natives of the value of their product. The same advantage does not appear to have been taken of the commercial possibilities as a year ago. On the last occasion several of the chiefs went on the trip on private cars and got into touch with all the agents en route, stirring up enthusiasm among them and among prospective purchasers. This was not done to the same extent this year, and it was of course impossible for the drivers to make any attempt to see agents or customers.

The tour failed to reveal any serious mechanical defects in the competing cars. Many of the withdrawals were due to reckless driving. The competition called for an average speed of 19 miles an hour on each daily run. In every case there was a desire to be first into controls, some of the drivers maintaining an average of 30 miles an hour for runs of 250 miles. On the first day a Rolling and an Optima were eliminated. Albert Guyot had to lift the bonnet of his Pierron and lost 4 points. An Aries lost 4 points and a Bozier 3 points on the second day. In this latter case it was declared that the toe board seals had broken accidentally, but this protest was not allowed.

Among those who went out were Barriaux, the Alcyon race driver, with a reported bent front axle, and his team-mate Louis Wagner, who failed to give any news of himself. An Aries

claimed an encounter with a cow; a Ponette an encounter with a stone wall. Repusseau's Anasagasti, a South American car built in Paris, lost its radiator fan in the Pyrenees, thus causing overheating. A Barré claimed that both rear tires burst on a bend and a companion machine preferred a close acquaintance with a stone wall. On the last stage, when only 20 miles from home, Riviere, who had driven his Metallurgique hard from the beginning, was held up with rear axle troubles, a mishap which was officially put down to a leaky gasoline tank. This machine had possessed a clean score up to this point.

No complete team succeeded in getting through the trials without the loss of a unit. Buick and Majola started with only one car and got that one through without the loss of points. While at Nice the Buick was backed into by another competitor, but this did not prevent it finishing in good shape, despite its bent front axle.

One of the weakest points of the car equipments appeared to be the provision for baggage. In nearly all cases there were only two men aboard, thus leaving the whole of the rear compartment free for personal belongings and spare parts. Not a single car had a sufficient oil supply to undertake the long daily runs without renewal. In consequence fillers were brought up through the bonnets or reserve tanks were fitted on the dashboards, thus making it possible to renew the supply without lifting the bonnet. The regulations stipulated that the cars should be standard models, but this was not rigidly enforced. One of the firms, for instance, took out the standard motor and put in a specialist's high-efficiency 3-liter model.

The following is the list of machines finishing with clean scores:

Car	Driver	Cylinders	Bore	Stroke
Aries	Vandenborn	4	2.9	5.5
Corre La Licorne	Collomb	4	2.9	5.9
Anasagasti	Brown	4	3.1	5.5
Anasagasti	D'Avary	4	3.1	5.5
Metallurgique	Duray	4	3.1	5.1
Barré	Revaud	4	3.1	5.5
Majola	Doutre	4	2.6	3.9
Pierron	Delaunay	4	3.5	5.1
Buick	Drouillet	4	3.7	3.7

1,000 Miles in 6 Days in Quaker Run

PHILADELPHIA, PA., March 29—Approximately 1,000 miles were covered during the past 6 days by the Multiplex car in the 30-day sealed bonnet test being conducted by the Automobile Club of Philadelphia. Unusually heavy going was encountered throughout the week, frequent heavy rains converting the roads into quagmires and necessitating slow running, with a consequent decrease in the total mileage.

The following routes were covered:

Saturday—Philadelphia to New York by way of Bristol, Trenton, Princeton, Plainfield, Newark, and returning via Elizabeth, New Brunswick, Princeton, Columbus, Burlington and Camden.

Sunday—Philadelphia to Lancaster via Paoli, West Chester, Downingtown, Coatesville, Gap, Lehman; returning, Mechanicsburg, Blue Bell, Morgantown, Conestoga, Downingtown, Philadelphia.

Monday—Philadelphia to Mays Landing and return by way of Camden, Gibbstown, Pedricktown, Pennsville, Salem, Quinton, Shiloh, Bridgeton, Millville, Malaga, Mays Landing.

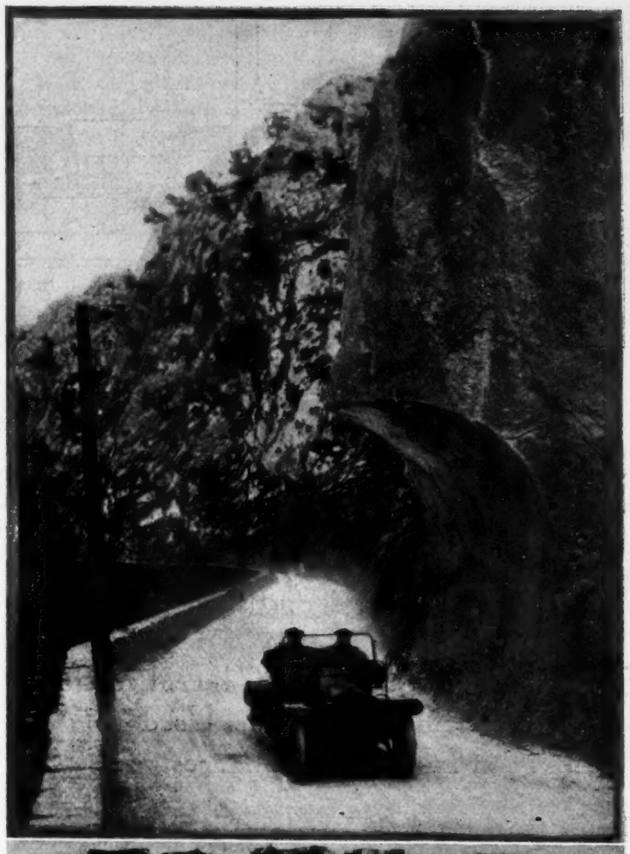
Tuesday—Philadelphia to Bethlehem, through Easton, Pa., over to Phillipsburg, N. J., back to Washington, Schooley's Mountain, Chester, Bedminster; returning, Somerville, Princeton, Trenton, Langhorne, Bustleton, Philadelphia. The original intention to go to the Water Gap from Phillipsburg on this day had to be abandoned owing to wretched road conditions above Belvidere.

Wednesday—Philadelphia to Camden, Hammonton, Pleasant Mills, New Gretna, Absecon, Egg Harbor, Mays Landing; returning, Hammonton, Indian Mills, Medford, Mount Holly, Columbia, Burlington to Palmyra and back to Camden.

Thursday—Owing to heavy rain, day's work was confined to a short spin to Trenton, N. J., and return.

PHILADELPHIA, PA., March 29—On Saturday, May 3, the Quaker City Motor Club will conduct its annual spring sociability run to Atlantic City, N. J., and return. The event will be of the same nature as last year's, except that the gasoline economy test will be omitted, prizes to be distributed under the rules governing secret time schedule runs.

Washington Truck Run Sanctioned—The Washington, D. C., Post motor truck reliability run, which is to be held May 5, 6, 7 and 8, has been sanctioned by the American Automobile Association.



Upper—The Alcyon car which finished with a perfect score on the road between Nice and Avignon in the recent Tour de France, showing the way the rock has been cut to make room for the road

Lower—Competition was close at some points on the road between Nice and Avignon and some of the cars were bunched

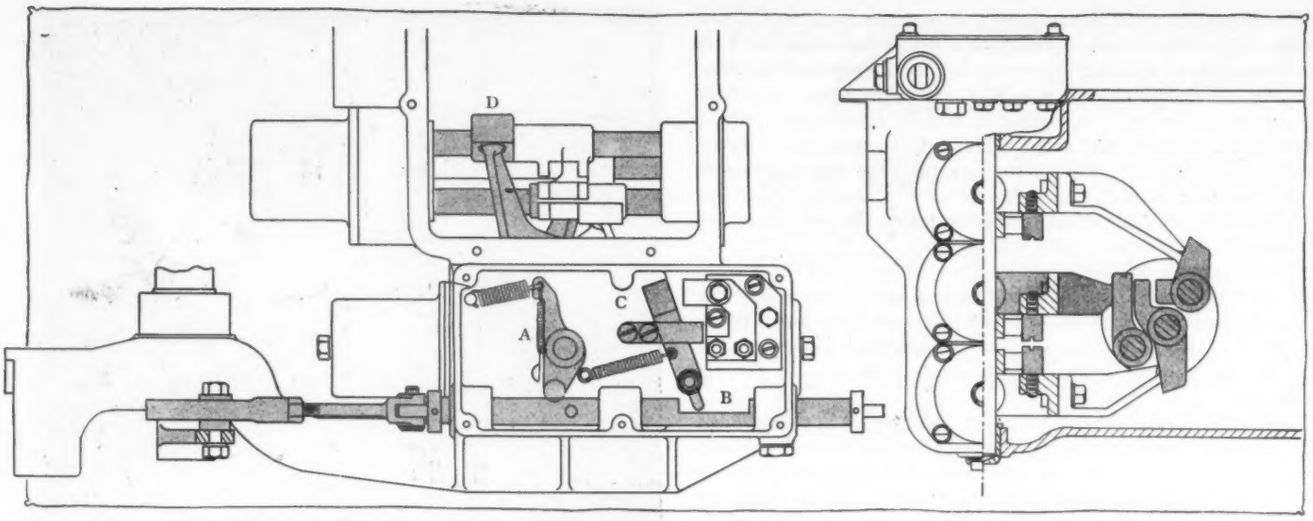


Fig. 1—Plan and end views of Vulcan electric gearshift now fitted to the S. G. V. cars as regular equipment

Vulcan Electric Gearshift

S.G.V. Car Adds New Control to Stock Cars—Solenoid Coils Used to Make Speed Changes

Electric Control Adds 46 Pounds to Car Weight—Exerts Pull of 150 Pounds at 17 Amperes

IT requires half the usual time to shift gears with the Vulcan electric control as now applied to the S. G. V. car. A system of buttons on the steering wheel and a slightly added length of clutch pedal throw compose the system as far as the driver of the car is concerned. It is merely necessary to touch a button corresponding to the speed at which it is desired to travel, press down the clutch pedal and let it back and the shift is made.

An idea of the appearance of the steering wheel with the device attached is given in Fig. 2. The buttons are numbered corresponding to the speeds which they control. If the fourth speed button is pushed down, the clutch thrown out and then re-engaged, the car will be in fourth speed. If the driver is traveling through traffic on third speed, he can set the second speed button and be ready at any moment by a simple motion of the clutch pedal to be in second speed. Or conversely, when traveling through traffic on second, and having the third speed button pressed down, a shift to third may be made instantaneously and without lifting the hands from the steering wheel.

It is impossible to strip the gears with this system because the clutch must be fully disengaged before the gears begin to move. The gears are always in neutral before the shift is made. This is accomplished by a positive mechanical action which is a part of the pedal motion in disengaging the clutch.

No two speeds can be engaged at once because each speed is governed independently of any other and an interlocking device provides that no two buttons can be down at the same time. If the second speed button is set and the driver changes his mind and decides that his next shift will be into fourth, he merely presses the fourth speed button and the second speed button returns to its normal position. Pressing the button marked Neutral, leaves all the buttons up.

The secret of this control is a system of solenoid coils. There are five of these coils, one for each forward speed and one for reverse. Two switches are interposed in the line between the battery and the solenoids, first, a knife switch which is controlled by the clutch pedal and second, the push button switch operated from the steering wheel. The knife switch controls all the changes while the push button switch only controls the particular solenoid belonging to the speed which it is intended to engage.

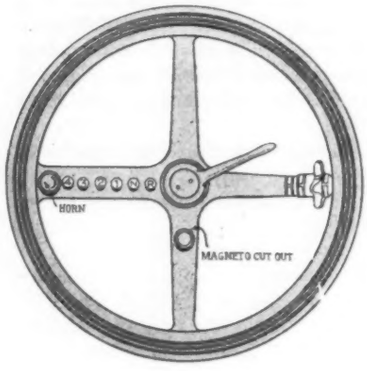


Fig. 2—Appearance of the steering wheel when control buttons are located in the spider. On demonstrator model buttons are arranged in circle on metal box

A study of the clutch pedal arrangement shown in Fig. 3 will disclose the fact that the pedal moves through a link L, for the first part of its motion and during the rest of its movement, picks up the link and pulls it along with it. The first part of the pedal throw has only to do with the clutch. The clutch may be slipped in ordinary driving in the usual manner. The movement after the clutch has picked up the link operates the knife switch sending the current through the solenoid coil and pulling a plunger against a magnet with a force of 150 pounds. This force is transmitted through an arm to the gear shifter fork and the speed change is made.

In the sectional elevation given in Fig. 3, the solenoid coils are seen. These are labelled first, second, third, fourth and reverse speeds in the drawing. The plungers are shown in neutral position. When the button is pressed and the knife switch thrown in a 12-volt current is passed through the coils surrounding the plungers and they are drawn against the magnets. The pull of 150 pounds is enough to shift the gears instantaneously and without any sign of clash. Since the gears cannot be shifted until the pedal has traversed sufficient distance to fully disengage the clutch, there is no danger of stripping the gears through meshing while the clutch is still engaged.

The box containing the switches and solenoid coils is mounted on the side of the gearbox. An idea of the method of arrangement may be seen in Fig. 1. The left view in this illustration is a diagram looking down on the shifter mechanism. The pedal and switch shaft B, may be seen along with the knife blade switch C, and the neutral camshaft lever A. The function of

Tate Electro Vaporizer

Electrically Heated Spray Into Intake Manifold Insures Easy Starting From Cold with Heavy Fuel

Device is Wired to Lighting Battery and is Only in Action for a Few Seconds When Starting Up

FOREMOST among the subjects engaging the attention of automobilists at the present time is that which, with perhaps an undue show of concern, has become known as the fuel problem. The gradual introduction of the heavier kinds of fuel is inevitable, and there is a disposition among many to imagine, among other things, increased trouble in connection with engine starting, as the result.

There is little ground for such anxiety, in spite of the fact that the carbureter as made at present will need further evolution to enable it to deal with a heavier grade of spirit. The possibilities of kerosene have stimulated action on the part of carbureter designers and there is doubtless a great deal of experiment in this direction, much of it quietly conducted, going on throughout the country at the present moment.

A primary need in the vaporization of heavy fuel so as to permit easy starting is the addition of heat. Without it the efficiency of all the various engine cranking devices on the market will be greatly diminished. This heat is only necessary at the start. Once warmed up, vaporization of even as heavy a mixture as 50 per cent. gasoline with 50 per cent. kerosene presents no insuperable difficulties to the carbureter.

With the widespread adoption of electricity on the modern automobile, the Tate Electro Vaporizer illustrated herewith, designed to meet the above requirements is of interest. This device consists essentially of a flange-shaped container to be inserted between the carbureter and the intake manifold, provided with a number of jets through which the fuel after heating by means of electricity, is sprayed into the manifold passages. The supply of gasoline to these jets is governed by an electro-magnetic valve incorporated in the device and operated by a switch on the dash.

A sectional plan and elevation of the vaporizer is shown in the accompanying illustration. It will be seen that the flange-shaped body F, which is made of a non-metallic substance, is drilled to coincide with the gas passage and bolt holes of the carbureter flange, the annular groove G being formed into a closed chamber by the insertion of a tight fitting brass tube through which a number of fine holes, J, are drilled around the diameter. A resistance coil, C, is arranged within the groove and connected to external terminals, from which wires lead to a magnetic valve and thence to the battery and switch.

The valve normally remains closed by the action of a light spring bearing on the needle. Current passing around the coil of the magnet lifts the needle through the magnetic attraction of a light iron armature fitted to its lower end. The device is connected to the main gasoline supply at S.

In the operation of the vaporizer the dashboard switch is first closed allowing current to flow simultaneously around the valve coil and the heating coil C. The valve then opens, admitting the fuel to the channel and in contact with the heating element, where it vaporizes, and on cranking the engine is ejected through the holes J. The spray mixing with the air drawn into the manifold results in a rich explosive mixture entering the engine. After starting up, the dashboard switch is opened, throwing the vaporizer out of action.

It will be noticed that the device is extremely easy to fit, occupying small space and requiring only slightly longer flange bolts. No special battery is required as a current of 5 amperes at 6 volts is sufficient to operate and this is easily available for the short periods necessary by attachment to the ordinary 3-cell lighting battery. The makers state that with the current above mentioned a period of 6 seconds is all that is necessary to fill the intake manifold with a hot gasoline vapor.

This vaporizer is being marketed by the United Motor Equipment Co., Chicago.

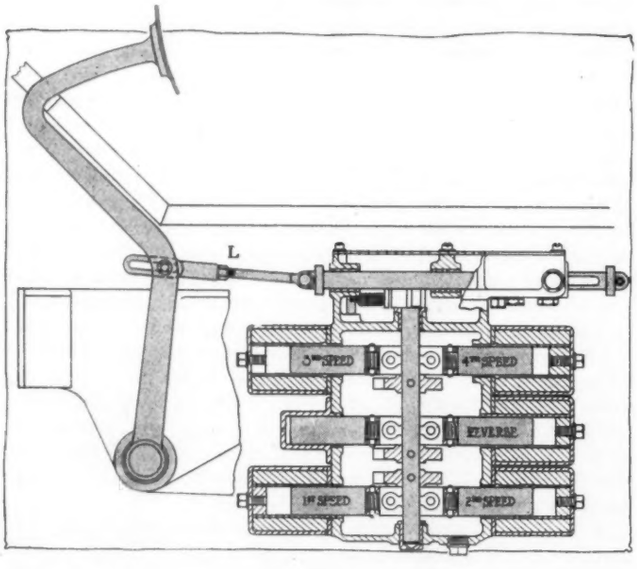
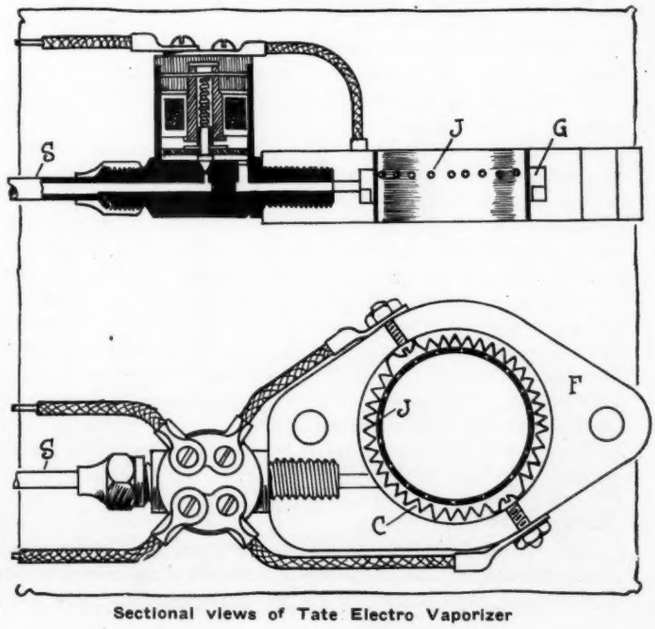


Fig. 3—Sectional elevation through Vulcan electric gearshift, showing Solenoids

the camshaft which extends across the control box between the solenoids, Fig. 3, is to positively pull the gears back to neutral between shifts.

The current required to make the shift is 17 amperes, and the S. G. V. company figures that 300 shifts can be made with less current than it takes to start the car once and that the added weight to the car is but 46 pounds when the entire electric control system is considered. This includes lighting and starting. The buttons on the steering wheel are arranged on the demonstrator model on a circular box instead of in the steering wheel spider as shown in Fig. 2.



Sectional views of Tate Electro Vaporizer

Gearsets Show Conservative Design

Selective Sliding-Gear Varieties Maintain Lead, Although Designs with Gears in Mesh Are Always Numerous—Four-Speed Types Offered by Most Makers

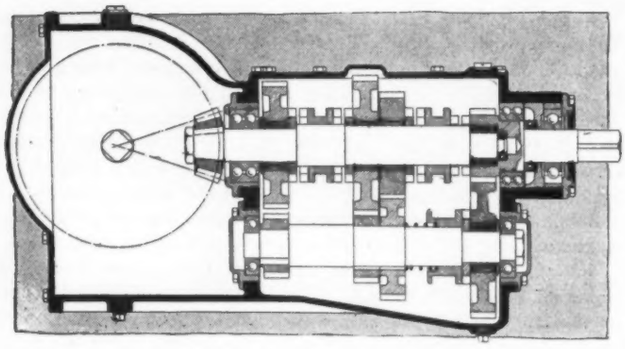


Fig. 1—Cotta model ECA. The gears are always in mesh

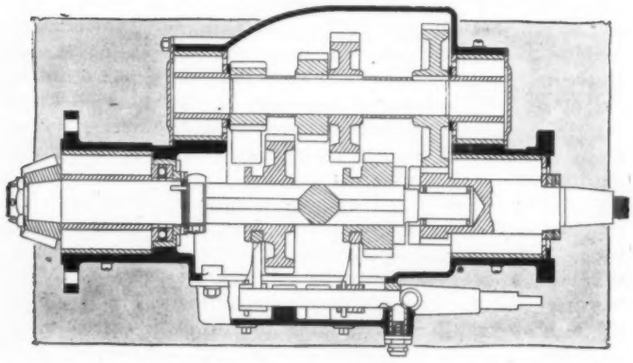


Fig. 2—A Covert sliding-gear type for commercial cars

MANUFACTURERS who make a specialty of producing gearsets for the automobile builder show little or no change in the design or construction of their products over the preceding year other than an occasional detail refinement. In fact, the gearset unit is now looked upon as practically standard, the majority of the types being of the sliding, selective style with a layshaft carried at the side of or below the main shaft. There are, however, several constructions in which the gears are constantly in mesh, dogs or jaw clutches being shifted in place of the gears.

Refinements, if any, have generally consisted in the strengthening of such parts as the shifting forks; changing the composition of some of the steels or other materials used in the constructions; mounting the shafts on other types of bearings; widening the gear faces; changing from splined to squared shafts, or vice versa; or in making other small differences, each of which, in itself, is of small consequence, though in the mind of the designing engineer of enough importance to increase of efficiency to merit its incorporation.

A résumé of the types offered by some of these specialists is given.

Brown-Lipe

The Brown-Lipe Gear Company, Syracuse, N. Y., manufactures gearsets for use in connection with the crankcase as a unit power plant construction, or for mounting on the frame apart from the crankcase. In Fig. 3, model 35 is shown, which is designed for use as a unit with the motor, the clutch and flywheel being seen mounted in connection with it. The design here seen has three forward speeds and reverse of the selective type. The shafts are both mounted on Timken roller bearings which are carried in removable cages in the ends of the gearcase. The sliding gearshaft is squared, its forward end being also carried on a Timken bearing. At the rear where it passes through the gearcase this shaft is provided with an adjustable packing ring which prevents oil leakage from the case. The lubricant is put into the gearcase through a large hole tapped at the top, while a plug at the bottom rear end of the case allows it to be drained when necessary. The ratios of the change gears in this design are 1.76 to 1 for the medium speed, 3.36 to 1 for the low and 4.32 to 1 for reverse. The Brown-Lipe gearsets are also mounted on annular ball bearings if so specified.

Cotta

In the gearset designs manufactured by the Cotta Transmission Company, Rockford, Ill., all gears are always in mesh, the individual clutch system being employed. In their standard forms, these outfits are furnished either for trucks having jackshafts and chains to the rear axles, for light commercial vehicles or for pleasure cars having shaft drive to the rear axles. In the Cotta construction, on the face of each of the speed change gears, which are mounted on roller bearings, there is a set of jaw clutches. On the driven shaft are two corresponding double sliding clutches, by means of which any one of the speed change gears may be locked to the shaft. On high speed the driving and driven shafts are locked together and the clutch on the counter shaft is disengaged. The drive is then direct and the counter shaft and all main shaft gears are idle. When the sliding clutch is returned from direct to neutral position the countershaft clutch automatically drops back into mesh.

The type of Cotta gearset shown in Fig. 1 is known as model ECA for jackshaft construction for trucks having a capacity of from 3 to 5 tons. The gears have a face width of 1.5 inch, the pitch of the transmission gears being 4.5 to 6; while that of the differential gears is 3.5. Gear ratios are 2 to 1 for intermediate, 4 to 1 for low and 4.125 to 1 for reverse. The reduction at the differential is 3.07 to 1. The same gear ratios are employed with the shaft drive types.

Several slight changes have been incorporated in Cotta construction. The gears were formerly mounted on plain bearings; they are now carried on roller bearings. The shifting forks have been shortened and made heavier. The ends of these forks are now provided with rollers where they are in contact with the clutch shoulders, having formerly been plain ends.

Covert

Covert gearsets are made for commercial vehicles ranging from the small 1,000-pound delivery wagon up to the 7-ton truck, as well as for pleasure cars from 20 to 50 horsepower. These are manufactured by the Covert Motor Vehicle Company, Lockport, N. Y., and are designed for use in unit with the rear axle, as well as for jackshaft truck constructions. Fig. 2 gives an idea of the general design of a typical Covert type. The shaft on which the sliding gears are mounted is squared, while all shafts are mounted on Hyatt roller bearings in the usual con-

structions, although several models are made in which the shafts are carried on annulars. In either case, the thrust load on the shaft connecting with the differential gears is taken by a thrust ball bearing, as seen in the drawing, Fig. 2. The shifting rod is carried at the side, being provided with the conventional ratchet arrangement for locating the various shifting positions. Oil packing rings prevent the escape of the lubricant from the housing. The gears are all of nickel steel which is carbonized, heat-treated and ground to fit the shafts and receive the bearings. The shafts are also of nickel steel, hardened and ground. Covert gearcases are of compact design and made of light malleable iron castings. They are provided with substantial flanges for bolting to the rear axle housing at the rear end and for attaching to the torque tube at the forward end. The portions leading to the flanges are webbed, making the construction very strong.

Detroit Gear and Machine Company

Although this Detroit concern makes the majority of its gearsets according to special specifications furnished by each of its customers, it also makes several standard types designed by its own engineers. A typical outfit for unit power plant constructions is shown in Fig. 5. This is a three-speed, selective, sliding-gear design, which may be said to be conventional in most respects, conforming to the latest engineering dictates. It is a center control type. The shafts are all carried on annular ball bearings, the main shafts being mounted on large single-row bearings, while double-row bearings carry the layshaft. A ball-thrust bearing is placed at the forward end of the propeller shaft connection. This shaft also is provided with a packing ring where it passes through the gearcase at the rear. The gears are of nickel steel and have .875-inch faces, the pitches being 6 to 8. The speed ratios are, for intermediate 1.875 to 1; for low 3.2 to 1; and for reverse 3.9 to 1. The sliding gear shaft is provided with four splines instead of being squared, as were the other types already considered. The usual cover plates and oil filling and drain plugs are provided.

Driggs-Seabury

The Driggs-Seabury Ordnance Corp., Sharon, Pa. produces a full line of standard gearsets for commercial vehicles. These being truck outfits, have the differential and bevel gears in combination with the change-speed gears for jackshaft designs. They are made in sizes ranging from the type for the 1-ton job to the 7-ton outfit. They all have three forward speeds and reverse, except the largest size, which has four forward speeds. The maker claims extreme simplicity of construction and accessibility for these gearsets. The gears are of large diameter, carried on splined shafts. These parts are of alloy steel.

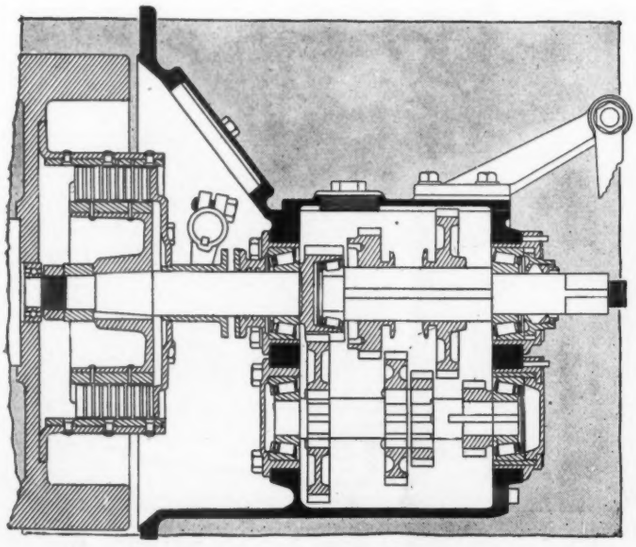


Fig. 3—Brown-Lipe model 35 unit power plant gearset

Three-point suspension is a feature of the Driggs-Seabury units, the forward end of the gearcase providing a bearing for a universal trunnion which is swung from a cross-member. Jackshafts and housings are furnished to meet the requirements o the customer, they not being standard parts as yet. The sever speeds of the gearset are controlled selectively by shifting rods assembled as a unit in a separate housing bolted to the right-hand side of the case, the removal of which allows the gear to be withdrawn at any time without disassembling the shifter box. The gearcase is provided with oil-filling and drain plugs. while oil packing rings surround the shafts entering and leaving.

Fuller

The Fuller & Sons Manufacturing Company, formerly the Michigan Automobile Company, Ltd., Kalamazoo, Mich., is now manufacturing its 30 to 40 horsepower, three-speed, selective, model T gearset in large quantities for automobile builders. This conforms to the general dictates of present engineering practice. The countershaft and the mainshaft are of large size, the main bearings being Hyatt roller types. The large idler gear runs on a solid roller bearing, while a double roller bearing carries the main shaft stub end. The case is of aluminum alloy while all gears and shafts are made of chrome-nickel steel. A variety of control sets is offered for both center and side control, while cases for either left or right drive in several styles are to be had. The Fuller concern also carries two models of planetary transmissions ranging from 6 to 12 and from 12 to 25 horsepower. These are designed for either chain or shaft drive.

Lefever

In the automobile line, the Lefever Arms Company, Syracuse, N. Y., manufactures selective-type gearsets and jackshafts for commercial cars from 12 to 40 horsepower; planetary gearsets and jackshafts from 12 to 40 horsepower; selective gearsets for pleasure vehicles up to 45 horsepower; and change gear levers.

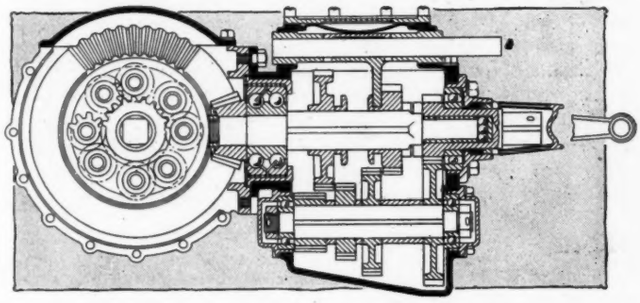


Fig. 4—Lefever gearset for trucks up to 40 horsepower

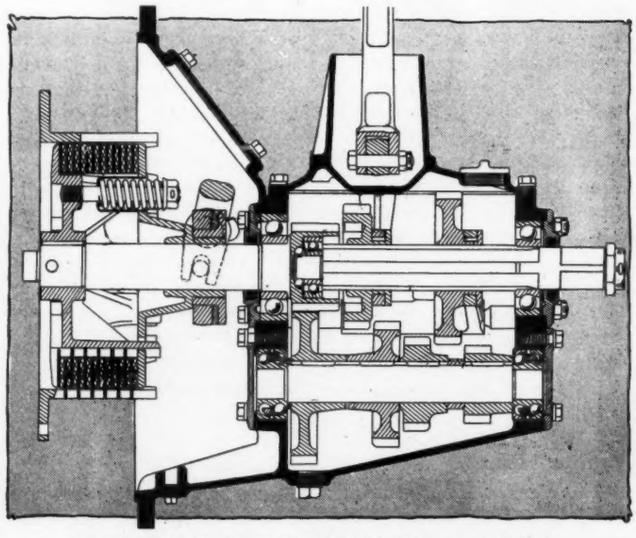


Fig. 5—Detroit Gear and Machine Co.'s unit design

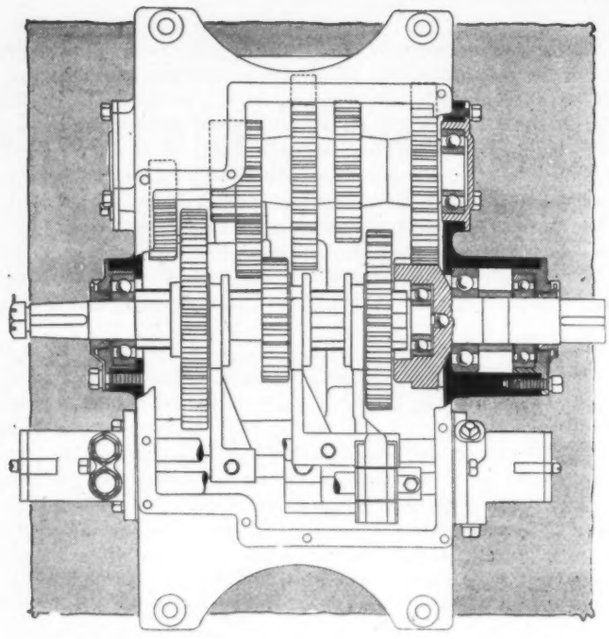


Fig. 6—Warner-Toledo four-speed type, direct on third

A typical design is the model 20, a sectional side view of which is given in Fig. 4. This model is for large trucks. This year sees no changes in the design of the Lefever products. Referring to Fig. 4, the gearcase bolts through a flange to the differential housing in the usual way. The shafts are mounted on annular ball bearings, a double-row bearing carrying the rear end of the mainshaft. A thrust ball bearing is placed at its forward end. At this end there is also a large packing ring preventing the leakage of oil from the case. The shafts carrying the gears are squared, the main sliding shaft being 1.1875-inch and the layshaft 1 inch square. All gears are made of 3.5 per cent. nickel steel, heat-treated. A feature of the Lefever gearsets is their compactness. They are provided with either single or two-rod control. The former allows application to any standard make of car, the only lever attachment being at the side of the frame, or the center, as the case may be. The Lefever planetary types are interchangeable with selective gearsets on the same jackshaft, the flange connections being standard.

Muncie

Practically all types of gearsets are numbered among the products of the Muncie Gear Works, Muncie, Ind., the pleasure car line including three- and four-speed types for mounting in unit with the motor and for placing amidships of the chassis apart from the power plant. In the commercial vehicle list are found selective, sliding gear types and planetary designs for assembling in unit with the jackshaft or for separate installation. All types of sliding gear constructions have ball bearings to carry the shafts, the heavier styles containing double-row ball bearings. Considering model T 64, which is a four-speed design, the speed reduction on first is 2.75 to 1; on second 1.56 to 1; and on fourth, .83 to 1. The third speed is the direct drive, the fourth having a 20 per cent. increase over direct. Another four-speed type is furnished, having direct on fourth, the ratios being: first, 3.6 to 1; second, 2.07 to 1; third, 1.32 to 1; reverse, 3.9 to 1.

In all designs suitable packing rings are provided where the shafts enter or emerge from the case, preventing oil leakage. Shafts are splined usually with four splines. Suitable cover plates for oil insertion and for inspection and adjustment are provided.

Warner-Toledo

The Warner Manufacturing Company, Toledo, O., announces that it is making a very complete line of three- and four-speed sliding gearsets arranged for sub-frame, unit power plant and rear axle constructions. The two latest gearsets of the Warner make are models 134 and 154. Both have four forward speeds, the former providing direct drive on third speed, and the latter giving the direct on fourth. Model 134 is shown in Fig. 6. The general description of both is the same. The housing of .28-inch aluminum has either four supporting arms for fixing to the sub-frame, or it is arranged for attachment to the crankcase of the motor. The gears have .875-inch faces and are of heat-treated alloy steel. They have very large diameters, the distance between the main and countershafts being 5 inches. These gears have a 14.5-inch pressure angle and have a 5 pitch. This angle gives a smooth rolling action tending to silence, it is said. The mainshaft has a diameter of 2 inches, while the layshaft is 1 1-2 inches in diameter. These are carried on annular ball bearings and the countershaft is splined for the gear sliding. Adjustable packing rings prevent oil leakage, and the shifting yoke rods are fitted with locating plungers.

The Warner company specially recommends these gearsets for heavy touring cars with motors up to 60 horsepower, although they are also suitable for the ordinary car. The gear ratios are well-proportioned, being determined by the results of considerable investigation on the part of the company's engineers.

Warner-Muncie

Every kind of selective, sliding gear type of gearset is manufactured for the trade by the Warner Gear Company, Muncie, Ind. That is, they are provided for unit power plants; for separate mounting on a subframe or on the chassis amidships; for rear axle unit constructions; for truck installations in connection with jackshafts. Model T-21 which is a type for 35 to 45 horsepower cars and has three forward speeds, is shown sectionally in Fig. 7. This is a typical Warner pleasure car construction for unit power plant application, the multiple-disk clutch in its separate compartment also being shown. The shafts are carried on Timken roller bearings, while the usual cover plates, oil plugs and oil packing rings are to be found. The sliding gearshaft is provided with four splines. The gears of this model are 1 inch in face width and their pitch is 5. They are made of an alloy steel, heat-treated and ground, and are automatically locked in and out of mesh. The layshaft in this design is carried below the mainshaft and not at the side as is the case with some of the designs which we have seen.

Although Timken bearings are shown in the construction herewith, the Warner concern furnishes its gearsets mounted on ball bearings if so ordered. It does not list planetary types of gearing, but states that it is in a position to manufacture this type of transmission as designed by its own engineers or according to approved designs of others on order.

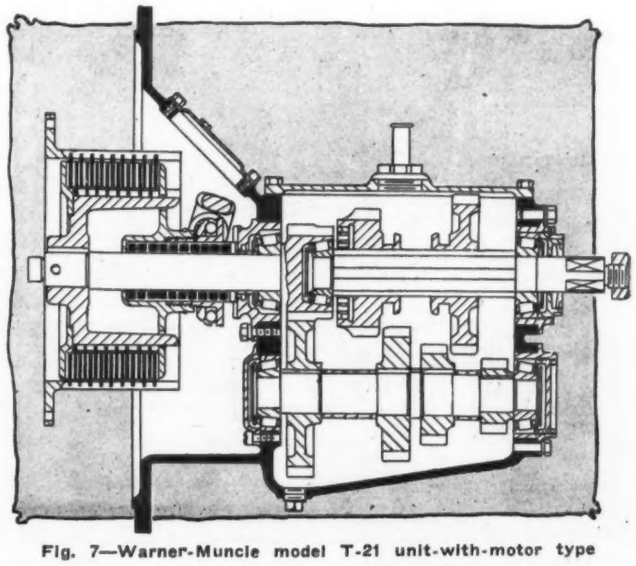


Fig. 7—Warner-Muncie model T-21 unit-with-motor type

Mondex - Magic Gearset

Single Pinion on Pivoted Shaft Transmits Drive to Stepped Internal Gear

A CHANGE speed transmission that represents a radical departure from ordinary practice is the Magic gearset, incorporated in the Mondex-Magic car, represented in this country by the Aristos Co., New York.

In this gearset the power is transmitted at all speeds through a single pinion which meshes with a special conical gear member connected to the forward end of the propeller shaft. This pinion, P, Fig. 2, is formed in one piece with the rear portion of a driving shaft S which connects to the clutch by a universal of the ordinary type. The shaft carries, just in front of the pinion, a sliding block J having ball bearings, which forms a means of moving the shaft end radially across the guide plate G. By doing so the pinion may be brought into mesh with any one of a series of internal toothed rings cut in the driven member C. The stepwise arrangement of these teeth is shown in Fig. 1. They are cut conically, that is, the common center of generation of all four rings is at a point corresponding with the universal at the forward end of the driving shaft. The high gear is obtained by inserting the driving pinion in the center gear ring where it acts as a jaw clutch. This forms a direct drive, as shown at A, Fig. 2. The low-gear position is shown at B.

The operating mechanism is not included in the illustrations, but this consists simply of the transverse shaft of the hand lever passing through the side of the gear casing at F, and having on its inner end a lever which engages with the sliding block J. A stud projecting from the under surface of the block into guideways and notches in the plate G makes it impossible to bring the teeth in mesh other than by a sliding movement.

Reverse is obtained by moving over the shaft until the driving pinion is in engagement with the intermediate pinion R, and then inserting both into the main gear member. This is accomplished by means of a lip L on the block which is brought up against a flange on the intermediate shaft, locking the two together. It will be observed that on all forward speeds the reversing pinion is standing idle, being held out of action by a light spring inside the bearing.

The driving pinion is kept in mesh by a spring surrounding the rear half of the driving shaft. The latter is really in two pieces, the forward portion, that connected to the universal being solid, while the part forming one with the pinion is tubular. A sliding keyed joint connects the two.

The conical gear member C is also in two pieces, but this is purely for constructional convenience. One ring contains the toothed racks for the first and second speeds, the third and high-gear teeth being cut in the other.

A short shaft, running in a plain bearing contained in a rearward extension of the gearbox, carries the gear wheel C, and transmits the power to the propeller shaft.

For operating this gearset a hand lever of the ordinary type is used, but the gate is much simpler, consisting of a series of regular steps for the four speeds and reverse. The rear edge of the gate represents the neutral position. By pulling the lever straight back, no matter what speed gear had been in mesh, neutral is secured.

Although, theoretically, some objection might be raised at the angularity of the driving shaft when in its low-speed positions, actual practice on the road, one car fitted with this gear having been tested over 18,000 miles, shows that this detail has less bearing on the efficiency than would be supposed. Efficiency with this method of drive is obtained by great accuracy in the cutting of the teeth and by the use of as long a driving shaft as is permissible. In the particular gearset illustrated the length of the shaft is such that the greatest angularity, which occurs on low speed, is the comparatively low figure of 4:30.

Bolt-on inspection covers are fitted to the gearcase and the forward extension which contains the driving shaft. The whole forms a single unit and is supported in the chassis on the three-point principle.

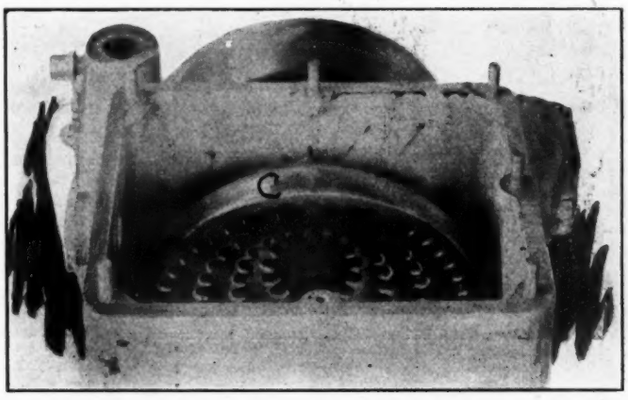


Fig. 1—Front view of the driven member, showing the four internal tooth rings which mesh with the driving pinion

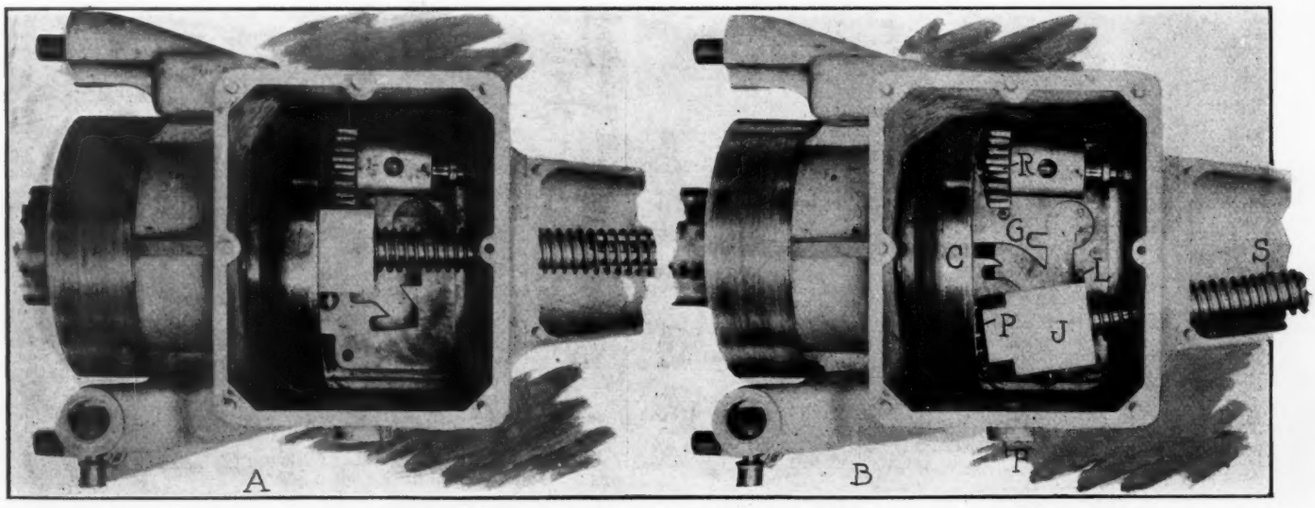
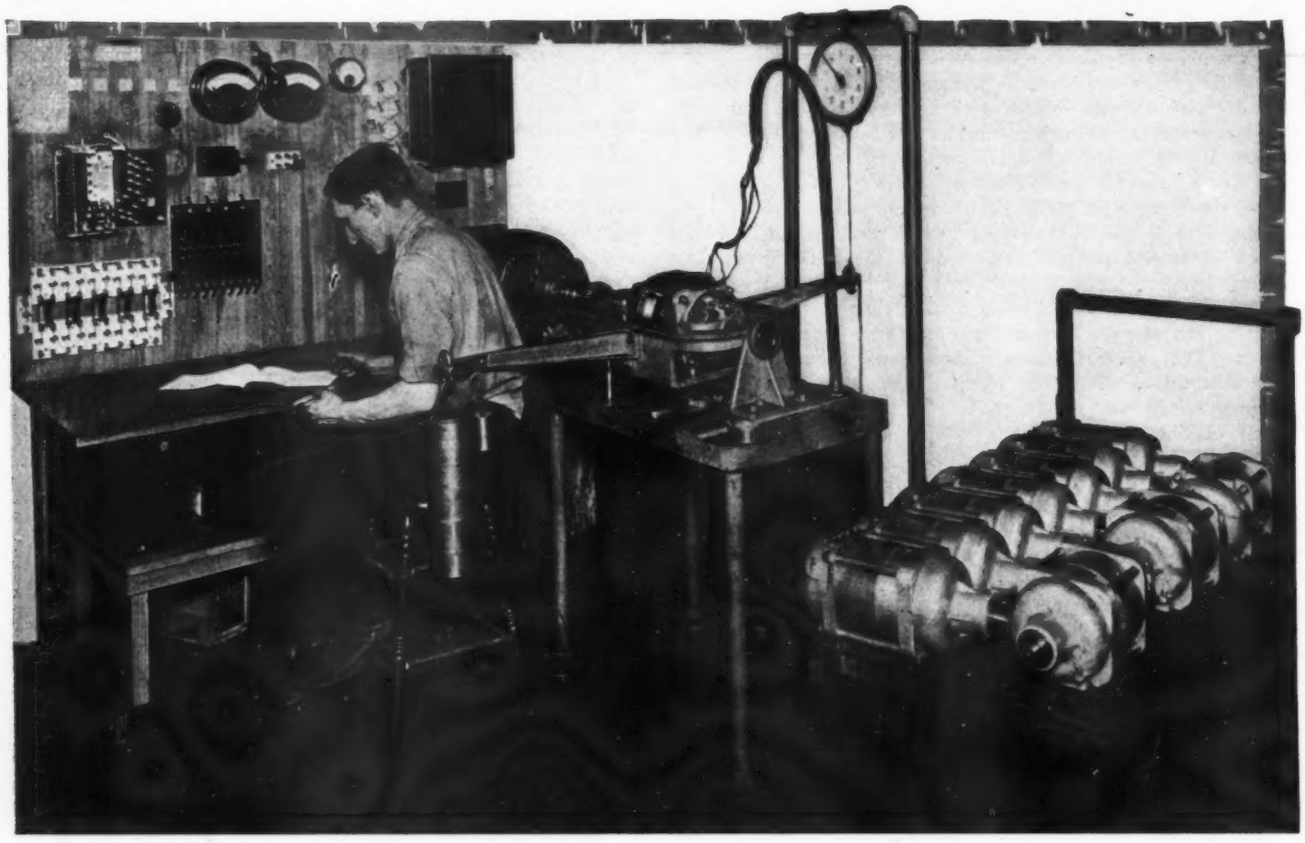


Fig. 2—The Mondex-Magic transmission in high and low speed positions. In high the drive is direct

Factory Miscellany



Testing apparatus used to determine the efficiency of the Aplco starting and lighting system in the factory at Dayton, O.

THE illustration herewith shows the testing device used in determining the efficiency of the Aplco starting and lighting apparatus, at the plant of the Apple Electric Co., Dayton, O. The apparatus is a small dynamometer upon which the output of the motor is registered. If the torque exerted by the electric cranking motor falls below the standard required for the size of the motor it is rejected. As a motor the motor-generator used by the Aplco system must develop a capacity 200 per cent. greater than that required to turn over the automobile motor to which it is to be fitted. When used as a generator the motor-generator must develop sufficient current to light a full set of lamps and maintain the current in a storage battery at a speed corresponding to 12 miles an hour of the car. The performance of each instrument is noted and a record kept corresponding to the number of the instrument. It takes only one man to operate the testing outfit, and as may be noted, he sits at a table, operates the switches on the torque lever and notes down the readings at different speeds and under different loads. This gives a complete record of the performance of each instrument. These records can be filed and a complete check on the instruments in service maintained.

SALT LAKE Wants Truck Factory—If the plans and hopes of certain citizens of Salt Lake City, Utah, are carried out, the Utah state capital will have an automobile factory in the near future, representing an investment of $1,000,000 or more. The intention is to start a plant for the manufacture of motor trucks, suitable for mining work, for which there is a big market in Utah and the neighboring states.

Winton Increases Wages—The Winton Motor Car Co., Cleveland, O., has recently voluntarily increased the wages of its employees 10 per cent.

Mohawk Buys Stein Plant—The Mohawk Rubber Co. has been organized at Akron, O., and has bought the Stein Double Cushion Tire Co. plant and machinery for $350,000.

Evans Builds—The Evans Motor Car Co., Nashville, Tenn., which is being organized by R. H. Evans, has secured an 8-acre site 6 miles from Nashville and will erect a three-story building, 250 by 300 feet. The company will have $200,000 capitalization, and the plant will cost $60,000.

Ford's Los Angeles Plant—Bids for the construction of a five-story reinforced-concrete factory building to be built in Seattle, Wash., by the Ford Motor Car Co., Detroit, Mich., and to cost in the neighborhood of $250,000, will be called for within the next 30 days by the N. W. representative, H. P. Rice. It will be located at the south end of Lake Union.

Duff Plant Moved—The Duff Mfg. Co., manufacturer of the Barrett lifting jacks, has moved into its new plant and general office building located on Preble avenue, N. S., Pittsburgh, Pa. The new plant comprising approximately 68,000 square feet of area is located on a 5-acre site. The company is also planning the erection of plant in Chicago, Ill., and expects to have this factory in operation by next fall. A Canadian plant will be equipped this summer to be in operation by the early fall of 1913. The Canadian plant will be located at Windsor or Hamilton, Ont.

Big Los Angeles Plant—Plans are being prepared for the factory to be established on the 30-acre site in Wilmington, Cal., for the Los Angeles Motor Truck Mfg. Co. It is the intention to erect five reinforced-concrete buildings. The plant complete will cost, it is estimated, more than $300,000. The main factory building will be two stories, 60 by 300 feet; assembling building, one story, 120 by 200 feet; finishing building, one story, 80 by 280 feet; administration building, two stories, 40 feet by 60 feet, and power house, one story, 60 by 60 feet. Offices of the company have been opened in the Los Angeles, Cal., Investment building.

Ford's Kansas City Addition—The Ford Motor Co., Detroit, Mich., will increase the capacity of its assembling plant at Kansas City, Mo., and add equipment.

Land Deeded to Goodrich—Seventeen acres of land at St. Catharines, Ont., have been deeded to the B. F. Goodrich Co., Akron, O., for a Canadian tire factory, which it is said will employ a thousand men.

National Rubber Purchases Land—The National Rubber Co., Alliance, O., recently organized, has authorized the purchase of land and asked for the submitting of bids for the construction of the new plant.

Swinehart Awards Contracts—The Swinehart Tire & Rubber Co., Akron, O., has awarded contracts for the addition of a three-story building to its main plant at Akron, O. The new structure will be 100 by 70 feet.

Ford's New Plant—The Ford Motor Car Co., Detroit, Mich., is planning the erection of a new plant which is to be six blocks long and three stories high. Three million barrels of cement will be employed in its construction.

New Heat-Treating Building—The Weston-Mott Co., Flint, Mich., manufacturer of automobile axles, is planning the erection of a new heat-treating building. The plans call for a one-story building 75 by 325 feet of saw-tooth design.

Lock Plant in Findlay—A new manufacturing project has matured in Findlay, O., with the incorporation of the United States Automobile Lock Co., with $15,000 capital. The company will manufacture a new type of automobile locking device.

Motor Truck Corporation Builds—The Motor Truck Mfg. Corp., Mount Vernon, N. Y., has been incorporated with a capital stock of $150,000 to manufacture and deal in motors, engines, etc., and will establish a plant at that city in the near future.

To Enlarge Plant—Bids have been given by the Cole Motor Car Co., Indianapolis, Ind., for a $150,000 addition to the present plant. The new addition will be L shape, four stories high, built along modern lines. When finished the advertising force will move to the new plant.

Work on New Departure Plant—Work is now well under way in the Hartford, Conn., plant of the New Departure Mfg. Co., which was formerly occupied by the Whitlock Coil Pipe Co. The local plant will be utilized for the production of shaft hangers thus relieving the main works where automobile bearings are featured.

Building Permit to Swinehart—A permit was recently applied for by the Swinehart Rubber Co., Akron, O., for a three-story building, to be erected at Howard and North streets. This structure will be erected at a cost of $20,000 and will be occupied for tire building. The new plant will be 60 by 102 feet.

Shows, Conventions, Etc.

Mar. 27-April 3	Quincy, Ill., Mississippi Valley Automobile Show, H. F. Hofer, Director.
Mar. 31-April 5	Manchester, N. H., Automobile Show, Dealers' Association, J. H. Graham, Manager.
April	San Antonio, Tex., Annual Show, San Antonio Motor Car Show Co.
April 1-6	San Francisco, Cal., Motor Truck Show, Coliseum Hall, *Motor Field.*
April 5-19	Pittsburgh, Pa., Annual Show, East Liberty Market House, Dealers' Association.
June 5, 6, 7	Detroit, Mich., Midsummer Meeting of Society of Automobile Engineers.
October	Paris, France, Automobile Show, Grand Palais; 10 days.
November	London, Eng., Annual Automobile Exhibition, Olympia.

Race Meets, Runs, Hill Climbs, Etc.

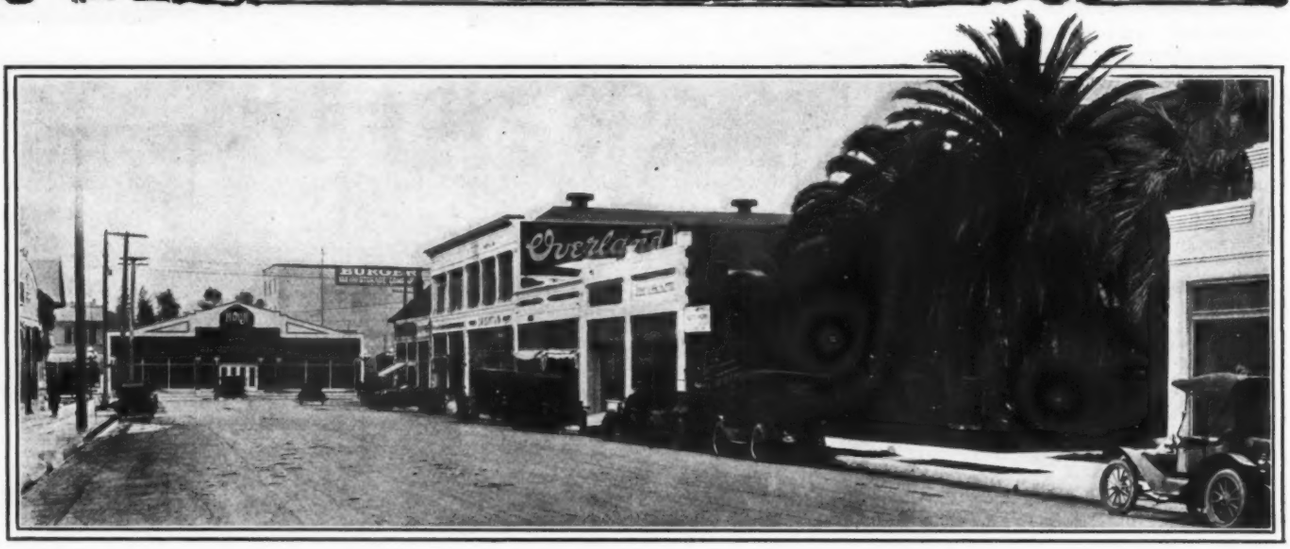
April 28-30	Chicago, Ill., Commercial Vehicle Demonstration, Chicago Motor Club.
May 5-8	Washington, D. C., Motor Truck Reliability, *Washington Post.*
May 14	New York City, Start of 2-Day Hudson and Catskill Scenic Tour.
May 30	Indianapolis, Ind., 500-Mile Race, Speedway.
June 25-28	Chicago, Ill., Non-Motor-Stop Reliability, Chicago to Boston, Chicago Automobile Club.
July 1	Indianapolis, Ind., Tour of Indiana Automobile Manufacturers' Association to the Pacific Coast.
July 1-16	Winnipeg, Man., Motor Plow Competition, Dr. A. W. Bell, Manager.
July 4-6	Tacoma, Wash., Road Race, Montemara Festa Automobile Committee.
July 8-16	Winnipeg, Man., Midsummer Exhibition, A. C. Emmett, Manager.
July 27-28	Tacoma, Wash., Tacoma Road Races.
Nov. 24	Savannah, Ga., Vanderbilt Cup Race, Motor Cups Holding Company.
Nov. 27	Savannah, Ga., Grand Prize Race, Automobile Club of America.

Foreign

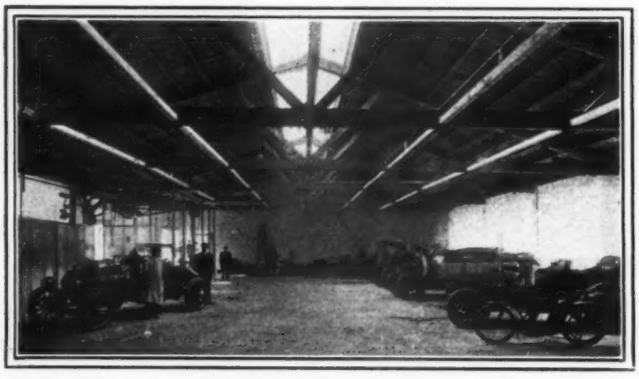
April	Barcelona, Spain, International Exhibition.
May	St. Petersburg, Russia, International Automobile Exposition, Building of Michael Maneze, Imperial Automobile Club of Russia.
July 12	Amiens, France, Grand Prix Race.
July 18-26	London, Eng., Imperial Motor Transport Conference.
Sept. 25	Isle of Man, International Stock Car Race.

Part of the wrapping-room at the factory of the Goodyear Tire & Rubber Co., Akron, Ohio. In this room the tires are put through a wrapping process before going to the vulcanizer for their first cure

News of the Week Condensed



Streets are wide and cars are numerous in Los Angeles, Cal. The above illustration shows part of the Los Angeles automobile row



View of the interior of the new garage adjoining the salesroom of the Buxton & Childs Auto Co., Los Angeles, Cal., distributors of the Moon

TRUCK Replaces Twenty-One Wagons—A gasoline motor truck and trailers have been shipped to the Wilbert mine near Arco, in the mountains north of Pocatello, Ida., to take the place of twenty-one wagons and twenty-one drivers in the transportation of ore from the mine to the railroad station.

Limbach Tribune's Engineer—H. C. Limbach has been made chief engineer at the Tribune Motor Co.'s plant, Detroit, Mich.

Central Adds New Agency—The Central Tire Co., Philadelphia, Pa., has opened an additional supply agency at 136 North Broad street.

Coronet Takes Service Recorder—The Coronet Mfg. Co., Cleveland, O., has taken the agency for the Service Travel Recorder Co., that city.

Bryte to Handle Allen Wrenches—A. Bryte, of San Francisco, Cal., has taken the distributing agency for Allen wrenches on the Pacific Coast.

Schwab Speedwell Branch Manager—F. N. Schwab has been appointed branch manager of the Speedwell Motor Car Co., Dayton, O., in Chicago, Ill.

Tarlton Sells Garage Interest—P. E. Tarlton has sold his interest in the Tarlton-Porter Garage, Kenton, O., to C. B. Porter, who will conduct the business in the future.

Bricker Production Manager—M. L. Bricker, formerly superintendent of the Briggs-Detroiter Co., Detroit, Mich., has been advanced to the post of production manager.

Symonds in New Quarters—The Symonds Motor Car Co., 1228 So. Flower street, Los Angeles, Cal., opened its new headquarters. This firm represents the Marion car.

Times Square Company Buys—The Times Square Auto Co., New York City, has purchased the site at 56th street and Broadway, formerly occupied for years by Wyckoff, Church & Partridge.

Indianapolis Branch for S. R. B.—The Standard Roller Bearing Co., of Philadelphia, Pa., has opened a branch at Indianapolis, Ind., at 1201 State Life Bldg. L. M. Watkin, Jr., will be in charge.

Davis Plans New Garage—Rex Davis, automobile dealer of Theresa, N. Y., and agent in that town for the Ford car, plans to construct a new garage on the Getman House property, that city, this summer.

Blake with International Motor—K. M. Blake has resigned as manager of the Boston, Mass., branch of the Locomobile Company of America, Bridgeport, Conn., to become the New York sales manager for the International Motor Co.

Babcock Joins Enterprise Metal—H. L. Babcock, formerly with the H. H. Franklin Mfg. Co., Syracuse, N. Y., has become Western representative of the Enterprise Metal Co., of Syracuse. He will make his headquarters at 305 Ford building, Detroit, Mich.

Chandler Opens Cleveland Offices—The Chandler Motor Co., has opened temporary offices in the Swetland building in Cleveland, O. Sales Manager Emise says a factory site has been secured in Cleveland and that production will be in full swing by July 1.

Columbus Wants More Equipment—It is proposed to purchase a new combination ambulance and patrol wagon for the use of the police department of the city of Columbus, O. It is also urged that automobiles be purchased for the use of the detective department.

Moline Sales Force Meets—The Moline Automobile Co., East Moline, Ill., recently started a series of meetings representing all of its branch managers as well as the field force representing the factory. A full day was put in in discussion of the car in detail at the plant. Addresses were made by C. H. VanDervoort and R. W. Phelps.

New Agencies Established During the Week

PLEASURE VEHICLES

Place	Car	Agent
Akron, O.	Hudson	City Auto Sales Co.
Baltimore, Md.	Pullman	Shaffer Mfg. Co.
Baltimore, Md.	Stanley	Cook & Fletcher
Birmingham, Ala.	Stevens-Duryea	C. L. Brown
Carthage, N. Y.	Ford	Wilna Machine Co.
Denver, Colo.	Franklin	Mathewson Auto Co.
Erie, Pa.	Franklin	John Griffith
Eugene, Ore.	Michigan	F. G. Berger
Hamilton, O.	Hudson	Weiser & Hood
Hamilton, O.	Mitchell	Central Motor Co.
Hamilton, O.	Oakland	Weiser & Hood
Hamilton, O.	R. C. H.	Weiser & Hood
Hartford, Conn.	Krit	R. M. Spencer
Hartford, Conn.	Metz	Lewis M. Camp
Hornell, N. Y.	Maxwell	Geo. Elsenheimer
Logan, O.	Ford	Gage Auto Co.
Logan, O.	Hudson	Gage Auto Co.
Logan, O.	Overland	Gage Auto Co.
Philadelphia, Pa.	Auburn	Philadelphia Motor Sales Co.
Portland, Me.	Luverne	George Lovejoy
Syracuse, N. Y.	Pathfinder	T. A. Read Co.
Tacoma, Wash.	Metz	Hilton & Donaldson

COMMERCIAL VEHICLES

Place	Car	Agent
Auburn, Me.	Stewart	E. L. Jordon
Calgary, Alberta	Stewart	Lougheed & Webster
Galveston, Tex.	Stewart	Christianson Co.
Glens Falls, N. Y.	Stewart	Empire Automobile Co.
Hamilton, O.	Indian	Weiser & Hood
Jamestown, N. Y.	Stewart	J. E. White
New Orleans, La.	Stewart	M. Zilbermann
Niagara Falls, N. Y.	Stewart	Power City Auto Co.
Poughkeepsie, N. Y.	Stewart	John Van Benschoten
Saskatoon, Sask.	Stewart	George H. Hack
Seattle, Wash.	Stewart	W. H. Heinzerling
Syracuse, N. Y.	Stewart	Syracuse Garage
Syracuse, N. Y.	Alco	F. H. Edwards
Washington, D. C.	International	H. B. Leary, Jr.

Newark Purchases More Apparatus—Newark, N. J., has purchased three Palmer-Singer light six roadsters for its fire department.

Eames Standard Electric Manager—Hayden Eames has been appointed general manager of the Standard Electric Co., Jackson, Mich.

Bornstein with Premier—H. D. Bornstein has joined the Premier Motor Car Co., and will assist in the advertising and publicity work.

Takes L. & M. Tire Agency—The W. W. Price automobile repair works has taken on the agency of the L. & M. tires in Carrolton, O.

Smith Motz Tire Manager—The Motz Tire and Rubber Co., Akron, O., has engaged J. G. Smith as manager of its New York City branch.

New Fire-Fighting Apparatus—An automobile hook and ladder truck, costing $5,100, has been added to the Paris, Tex., fire department, making three motor machines now in service.

New Garage Owners—The Swalm Hardware Co., Pottsville, Pa., is about concluding negotiations for the purchase of the Youse garage, that city.

Middletown Wants Three Trucks—The fire department and council of Middletown, Pa., are considering the purchase of three automobile hose trucks.

Interborough Orders G. V. Trucks—The New York Railways Co., New York City, has ordered twenty-five electric trucks from the General Vehicle Co., that city.

Dustin Retail Sales Manager—The American-Marion Sales Co., 1896 Broadway, New York City, has secured the services of Lee N. Dustin in the capacity of retail sales manager.

Pope's Providence Service Station—The Pope-Hartford Automobile Co. has leased a new building, two stories high, 50 by 100 feet, in Providence, R. I., and will use it for a service station.

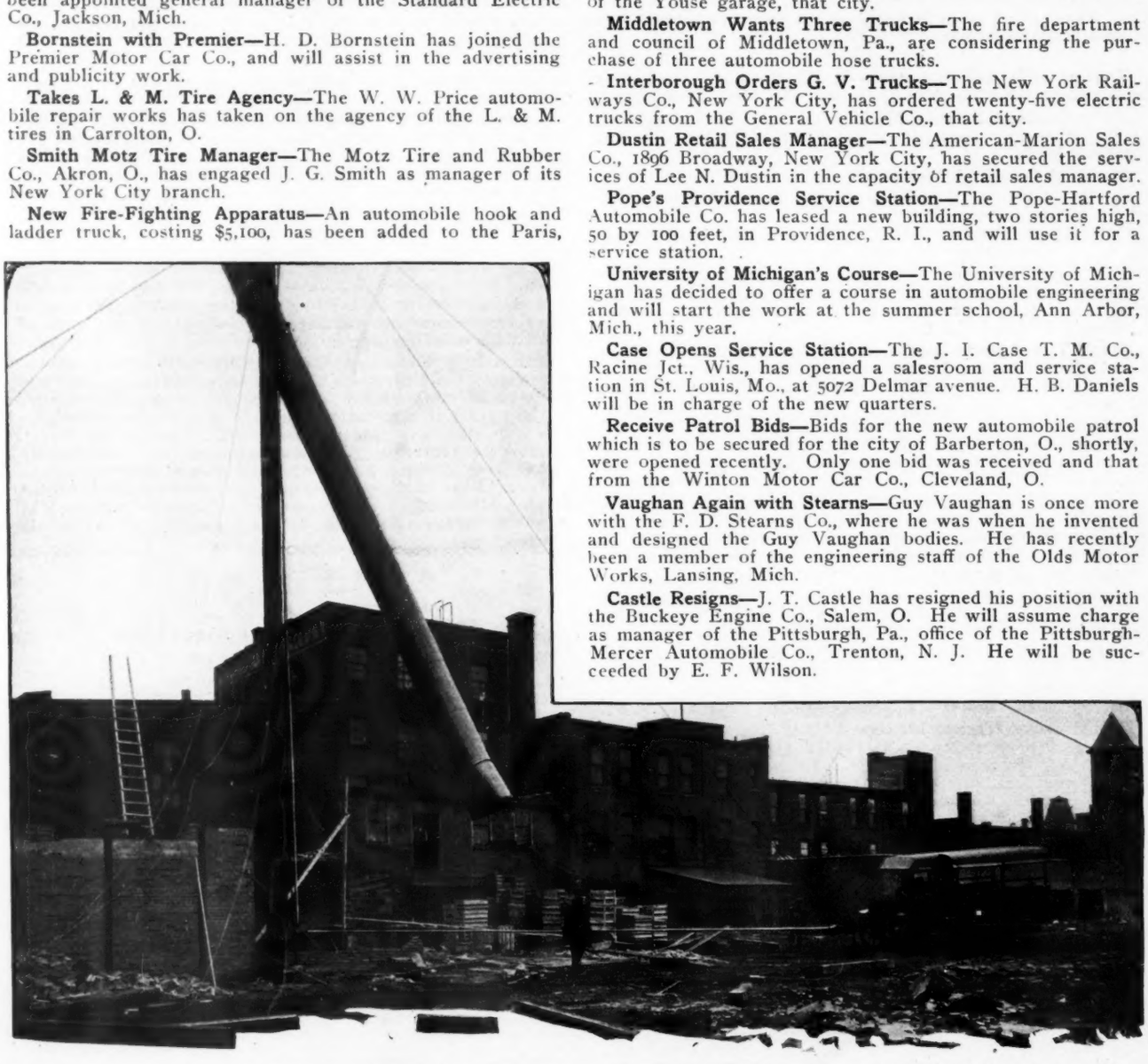
University of Michigan's Course—The University of Michigan has decided to offer a course in automobile engineering and will start the work at the summer school, Ann Arbor, Mich., this year.

Case Opens Service Station—The J. I. Case T. M. Co., Racine Jct., Wis., has opened a salesroom and service station in St. Louis, Mo., at 5072 Delmar avenue. H. B. Daniels will be in charge of the new quarters.

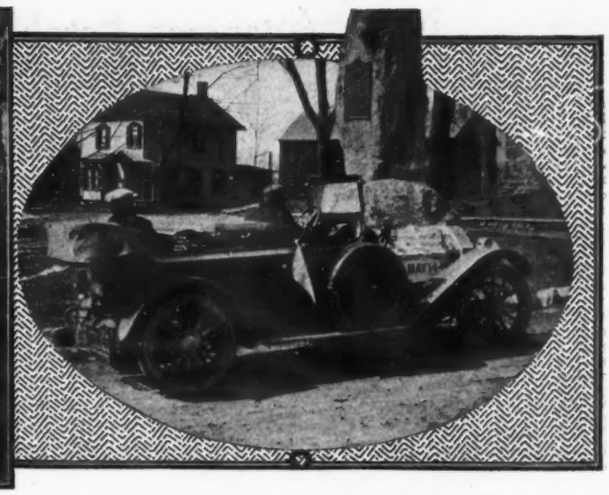
Receive Patrol Bids—Bids for the new automobile patrol which is to be secured for the city of Barberton, O., shortly, were opened recently. Only one bid was received and that from the Winton Motor Car Co., Cleveland, O.

Vaughan Again with Stearns—Guy Vaughan is once more with the F. D. Stearns Co., where he was when he invented and designed the Guy Vaughan bodies. He has recently been a member of the engineering staff of the Olds Motor Works, Lansing, Mich.

Castle Resigns—J. T. Castle has resigned his position with the Buckeye Engine Co., Salem, O. He will assume charge as manager of the Pittsburgh, Pa., office of the Pittsburgh-Mercer Automobile Co., Trenton, N. J. He will be succeeded by E. F. Wilson.



Showing one of the many duties to which a motor truck may be subjected. A White 3-ton truck utilized to hoist an 80-foot sheet-iron smoke stack into its cradle, 12 feet above the ground



The West Hudson and Catskill endurance, reliability, hill-climb and fuel economy test gives promise of being exceedingly interesting. It is planned to run the test, which will be conducted by "Senator" W. J. Morgan, on May 14-15. The accompanying illustrations depict the pathfinding car, an Alco six, at various points on the route which has been selected for the run. The one shown above at the left is from a photograph taken half way up the mountain between Palenville and Haynes Falls, N. Y. That at the right was taken at the monument at New Paltz.

Bennett with Abbott-Detroit—A. L. Bennett has become sales manager for the Abbott-Detroit Co., New York City.

Kelly Oakland Factory Manager—W. D. Kelly has been appointed factory manager of the Oakland Motor Car Co., Pontiac, Mich.

Stoddard Garage Addition—The Stoddard Motor Car Co. will erect a two-story addition, 60 by 50 feet, to its garage at Springfield, Mass.

Cole Agent Moves—The G. R. Cowie Co., Washington, D. C., has removed from 1317 H street, N. W., to 2121 Fourteenth street, N. W.

Skinner Portland Ford Manager—H. C. Skinner, from Houston, Tex., is now manager of the Portland, Ore., branch of the Ford Motor Car Co.

Plugit Tire Agency Established—Sub-agents for the Plugit liquid tire filler have been established throughout the state of Maryland by the Baltimore representatives, Gauer and Blaycock.

Atkinson Pacific Manager—Robert Atkinson, for some time past associated with J. W. Leavitt & Co., of Portland, Ore., has resigned and will act as manager of the Pacific Car Co., in Seattle, Wash.

La Grande's Fire Equipment—La Grande, Ore., though a city of the small class, has recently motorized its fire department, $8,000 being spent by this eastern Oregon city in the purchase of an automobile.

Bieler Branch Sales Manager—The Carl Spoerer's Son Co., Baltimore, Md., has appointed O. R. Bieler to take charge of the sales end of the Bosch products for which the Spoerer company is the local representative.

Adds Accessory Department—D. S. Hendrick Co., Inc., agent for the Abbott-Detroit, Franklin and Stewart truck, at 1024 Connecticut avenue, has added an accessory department. It will be under the management of W. Elkins Reed.

Hart Stewart-Warner Manager—T. M. Hart has recently been appointed manager of the Portland, Ore., branch of the Stewart-Warner Speedometer Co. He was formerly manager for the company in Los Angeles, Cal. He will be located at 57 No. Broadway.

Moran Executive Engineer—G. R. Moran, formerly chief engineer for Barthel, Daly and Miller, and later executive engineer in charge of the Detroit, Mich., office of the New Departure Mfg. Co., has taken a similar position with the Suspension Roller Bearing Co., Sandusky, O.

New Garage in Birmingham—Loveman, Joseph and Loeb have let a contract for the erection of a new garage at Avenue C and Twenty-first street, Birmingham, Ala. The building will be modern in every way and will be the largest structure, it is claimed, especially designed for automobiles in that city.

Another Railroad Adopts Automobile—Official notice of the adoption of motor-car service on the Chicago, Peoria and St. Louis Railroad has been given out. According to this notice four of these cars have been purchased by the company and two of them will be put into service in the near future.

General Motors Leases Building—The General Motors Truck Co., Detroit, Mich., has secured a long lease on a piece of property in the heart of automobile row and a building to be used as a salesroom and garage will be erected in the next 90 days. The building will be one story and will cost to build about $20,000.

Will Share Display Expenses—Owing to the increasing use of automobiles in the interior towns of Louisiana, New Orleans dealers are planning to share expenses in a display of cars at a number of points. Accessory dealers also will join the movement. An effort is being made to get special rates on the railroads for the transportation of the cars intended for exhibit purposes only.

University's Extension Course—The university extension division of the University of Wisconsin, Madison, Wis., has made another innovation by establishing an extension course in the operation and management of motor cars and trucks. The first class has been formed at Sheboygan, where E. M. Gorrow of Oshkosh, Wis., instructor in the extension division, is imparting knowledge and instruction relative to motors. Other classes are being established in Superior, La Crosse, Martinette, Wausau and other principal cities. The departure in extension work by the University of Wisconsin is attracting wide and favorable attention.

Automobile Incorporations

AUTOMOBILES AND PARTS

ACCIDENT, MD.—Motor Car Sales Co.; capital, $25,000; to manufacture, sell and deal in all kinds of engines, vehicles, etc. Incorporators: Newton Gies, G. N. Emory, C. C. Frederick.

BUFFALO, N. Y.—Ivey Motor Truck Co., Inc.; capital, $10,000. Incorporators: Chas. A. Ivey, A. L. Rusling, Frank G. Heller.

NASHVILLE, TENN.—Evans Motor Car Co.; capital, $200,000. Incorporator: R. H. Evans.

NEW YORK CITY—Greater New York Motor Co.; capital, $10,000. Incorporators: Samuel Marusi, Samuel Feldman, Cæsar Pinnisani.

NEW YORK CITY—General Auto Trucking Co., Inc.; capital, $25,000. Incorporators: George W. Freeman, Albert A. Benedise, Thomas G. Gannon.

NEW YORK CITY—Motor Coach Co.; capital, $500,000; to manufacture autos, motor car hearses and burial coaches. Incorporators: Sam Richenthal, Elbert R. Benyunes, Herman Miller.

NEW YORK CITY—Service Motor Truck Co. of N. Y.; capital, $7,500. Incorporators: Charles H. Roman, Elias T. Silverstein, Peter L. Stickney.

NEW YORK CITY—Signal Motor Truck Co., Inc.; capital, $350,000. Incorporators: F. C. Canfield, J. S. Coates, W. C. Floyd-Jones.

SCHENECTADY, N. Y.—Schenectady Auto-Car Co.; capital, $10,000. Incorporators: Emmet Fisher, A. Langaneuer, L. Buonfiglio.

STEUBENVILLE, O.—National Wave Motor Co.; capital, $1,000,000; to manufacture wave and water motors.

AYER, MASS.—Robert Murphy's Sons Co.; capital, $30,000; garage. Incorporators: John R. Murphy, William Murphy, Robert F. Murphy.

COLUMBUS, O.—Motor Owners' Supply Co.; capital, $40,000; to handle a complete line of automobile accessories and supplies. Incorporators: Geo. A. Archer, W. G. Fisher, James W. Carroll.

COLUMBUS, O.—F. & H. Wire Co.; capital, $25,000; to manufacture and deal in wire wheels for automobiles and accessories of all kinds. Incor-

Two more views of the pathfinding car on the West Hudson and Catskill endurance run. The above illustrations show the extremely muddy state at the present time of some of the roads in the region to be traversed by the tour. By the middle of May, when the run is scheduled to be held, these roads will probably be in excellent condition. Naturally, the scenic attractions will constitute one of the greatest features of the trip, the route to be followed winding up steep grades into some of the most picturesque parts of the Catskills and down into the quaint old villages filled with legendary interest. The pictures shown above were taken between New Paltz and Newburgh, New York.

Byrne CarterCar Manager—C. J. Byrne has been made manager of the CarterCar Co., Minneapolis, Minn.

Minneapolis Buys Patrol—The Minneapolis, Minn., police department has bought a Winton Six car for use of the detectives and the chief of police.

Critchley President I. A. E.—J. S. Critchley has been elected president of the Institution of Automobile Engineers, London, Eng., for the session 1013-14.

Auto Supply Leases Stores—The Auto Supply Co., Beloit, Wis., has leased the stores at 422-426 State street, Beloit, and will at once establish a large accessory and tire store.

St. Cloud Buys Saurer—The city of St. Cloud, Minn., has bought from the Twin City Motor Co. a Saurer motor sprinkling truck. The machine carries a 1,200-gallon tank.

New Twin City Garage—The Twin City Auto & Tire Co., Marinette, Wis., has purchased three lots on Hall avenue, that city, and will erect a new garage and sales building to cost about $25,000.

Superior Joins A. A. A.—The Superior, Wis., Automobile Club, which has been in existence for five years, has voluntarily voted to join the Wisconsin State Automobile Association and thereby the A. A. A.

Engineers Open Legal Bureau—The Automobile Engineers, St. Paul, Minn., will open a legal bureau and an exchange by which employers may get reliable chauffeurs. A branch is to be established in Minneapolis.

P. O. Tests Automobile—The Montclair, N. J., post office is testing the plan of using an automobile for collection and delivery of parcel post packages. The automobile may be adopted permanently for the parcel post service.

Diemann Granted Garage Permit—William Diemann, 725 Greenfield avenue, Milwaukee, Wis., has been granted a permit to build a garage and salesroom at that location to cost $10,000. No agency lines have been decided upon as yet.

Oil Company Plans Warehouse—The Viscosity Oil Co., Chicago, Ill., which is owned principally by the Travers interests of Beloit, Wis., is planning the establishment of a large warehouse and station at Durand, Wis., to supply the northwestern states.

I. A. E. Trip to U. S.—Up to the present some twenty members of the Institution of Automobile Engineers have definitely intimated their intention to take part in the trip to the United States, but it is anticipated that this number will be doubled before the sailing date arrives. The date for leaving London is May 17.

Goodrich Opens Minneapolis Quarters—The B. F. Goodrich Co., Akron, O., has opened its new quarters in the recently completed Glenwood-Inglewood building, Minneapolis, Minn., utilizing two floors and the basement, each 50 by 150 feet. A balcony is swung over the first floor. The company is making the first showing of the $500 clay model of the factory buildings.

Few Red Sea Coast Automobiles—There are sixteen automobiles in Aden, of which number six motor buses are practically useless. There is one 3 1-2-ton French motor truck. Only two of these cars are American, but one owner proposes to introduce six Fords as public vehicles, and has ordered two. All cars in Aden have been brought there since 1910, and many are second-hand. Only two or three are sold annually.

Changes in Locomobile Company—G. H. Bryan has assumed the duties of assistant advertising manager of the Locomobile Company of America, Bridgeport, Conn. W. H. Davis, Jr., formerly advertising manager of the Stoddard-Dayton Automobile Co., has been placed in charge of truck advertising. A. A. Stewart has joined the service department. F. P. Crockett has been appointed sales manager of the truck division of the Boston, Mass., branch.

Chance for Agency—A report from an American consular officer states that a firm in a Latin-American country, which has been acting as agent for a German automobile manufacturer, claims to have sold over 200 cars in less than two years. This firm now wishes to obtain the representation of a low-priced American car and asks to be put in touch with manufacturers, from whom it desires prices, terms, etc., with catalogs and prices of repair parts. Bank references are furnished and correspondence should be in Spanish. Those interested will please answer through the Bureau of Foreign and Domestic Commerce, Washington, D. C., File No. 10,600.

Automobile Incorporations

porators: L. S. Frayer, Chas. G. Howard, S. K. Wissinger, Chas. S. Hamilton, E. R. Sharp, Jr.

ISLIP, N. Y.—Brightwaters Garage, Inc.; capital, $1,000. Incorporators: Russell M. Fanning, William H. Corwin, Stewart L. Fanning.

JACKSONVILLE, FLA.—Seminole Rubber Co.; capital, $1,000,000; to manufacture tires and other automobile accessories. Incorporators: Geo. F. Hardy, Geo. H. Lutz, J. J. Weyer.

NEW YORK CITY—Henschel Tire & Rubber Co.; capital, $10,000; to manufacture tires for autos. Incorporators: Rudolph Henschel, Anna Henschel, William A. Wollman.

NEW YORK CITY—Hoffman Taxi Cab Co.; capital, $5,000. Incorporators: Richard J. Cruice, Andrew J. Finnerty, Geo. B. Jenkins.

NEW YORK CITY—Mohawk Rubber Co. of N. Y.; capital, $10,000; to deal in tires and rubber goods. Incorporators: Morris E. Mason, Chas. W. McLaughlin, Milton Dammann.

NEW YORK CITY—Peerless Tire Co.; capital, $15,000; to deal in auto tires and tubes. Incorporators: Michael Schiavone, Geo. P. Calenda, Louis Schiavone.

PITTSBURG, PA.—Auto Vulcanizer & Specialty Co.; capital, $5,000. Incorporators: Alfred Dickson, H. W. Graib, Frank L. Stern.

CHANGES OF CAPITAL AND NAME

CINCINNATI, O.—Leyman-Buick Co.; capital increased from $50,000 to $100,000.

COLUMBUS, O.—Quiggle Auto Co.; capital decreased from $10,000 to $2,000.

DETROIT, MICH.—Lozier Motor Co.; capital increased from $3,000,000 to $5,000,000.

FREMONT, O.—Safe Storm Front Co.; capital increased from $35,000 to $100,000.

PHILADELPHIA, PA.—Standard Gas & Electric Power Co.; change of name to Vulcan Motor Devices Co.

Patents Gone to Issue

EMERGENCY Automobile Tire—Consisting of a sheet-metal shell, the ends of which are held together by a bolt screwing into threaded openings of the caps which form the ends.

The emergency tire described in this patent consists of a shell made of sheet steel which is wound spirally as seen in Fig. 1. The shell S has left and right threads at its ends and caps C are applied over these threads to reinforce the shell ends. A cable K extends all through the tire and the cable ends are operatively connected with the caps C, holding thec aps tightly in place on the shell ends. The caps are formed with internally threaded members extending into the inside of the tire and a left and right threaded bolt engages these threads, connecting the two shell ends and permitting of tightening or loosening them.

No. 1,057,388—to Frank L. Bigsby, Kirksville, Mo. Granted March 25, 1913; filed October 3, 1911.

Shock Absorber—Including two heads and friction disks between them.

The shock absorber Fig. 2 includes two hollow, abutting heads, each of which has a radially-extending arm and one of which supports a ratchet wheel rotatable in it independently of the head

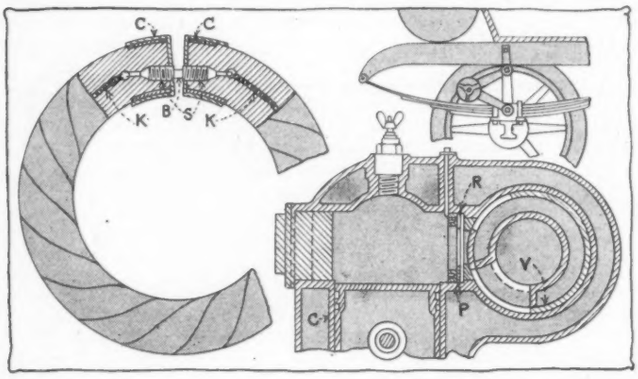


Fig. 1—Bigsby emergency tire. Fig. 2—Bohm shock absorber. Fig. 3—Tartrais valve packing

itself. The head carries a pawl which engages the ratchet, permitting its rotation in one direction only; this pawl is disengaged from the ratchet if the latter is moved in the opposite direction. From the center of the ratchet wheel extends a barrel which has radially projecting lugs and is journaled in the opposed head; the latter is formed with radially-disposed notches on its inside face. A number of friction disks are arranged in frictional engagement with each other between the two heads and alternate disks have teeth engaging respectively with the barrel and the notches in the head.

No. 1,057,030—to Andrew Bohm, Morristown, N. J. Granted March 25, 1913; filed October 21, 1911.

Rotary Valve Packing—Consisting of a threaded ring in the cylinder wall, a packing ring and a washer between them.

The subject matter of this patent is a packing for a rotary valve, Fig. 3, which consists of a threaded ring R which is screwed into the cylinder wall opposite to an opening which communicates with the rotary valve V provided for admitting and exhausting the cylinder gases. A packing ring P is in contact with the valve V and a washer is in place between the two rings, means being provided for stopping the opening.

No. 1,057,297—to Eugene Henri Tartrais, Montmorency, France. Granted March 25, 1913; filed June 15, 1912.

Automobile Lifting Jack—Consisting of a vertical web formed with a stop for engaging the axle support.

The jack described in this patent, Fig. 4, consists of a body which is formed of a flanged base portion B and a vertical, segmental web W. The latter extends along the longitudinal middle of the base and has a stop on its upper edge. An axle support which consists of a bar B1 pivoted at P to the body and provided with a device adapted to engage the stop serves for raising the automobile and holding its elevated position.

No. 1,057,315—to William T. Adams, Cornith, Miss. Granted March 25, 1913; filed April 3, 1912.

Automobile Tire—Comprising a fabric ring held together by a binder.

The tire described in this patent and shown in Fig. 5 consists of a hard, compact ring R; the latter is composed of transverse, radially arranged plies of woven fabric which are compressed circumferentially, radially and transversely of the ring. The plies of the ring have their threads arranged diagonally to form a wearing surface of thread ends. The plies are held assembled and compressed by a binder B.

No. 1,056,976—to Bradford H. Divine, Utica, N. Y. Granted March 25, 1913; filed March 6, 1911.

Shock Absorber Construction—Being of the friction-disk type.

The shock absorber, Fig. 6, consists of two outer disks, an inner disk of smaller diameter than the outer disks and lever L carrying these disks. A friction member is arranged between one of the outer disks and the opposed face of the inner disk and is provided with a surface which frictionally engages the inner disk; it is formed with a ring outside of the periphery of the inner disk, and another friction element is in place between the ring and the second outer disk. A third friction element contained inside the ring has surfaces coacting with the second mentioned friction element and one with the inner disk. The three friction elements have contact surfaces spaced different distances apart. One of the levers is movable into successive contact with these surfaces.

No. 1,057,292—to Charles N. Sowden, Guantanamo, Cuba. Granted March 25, 1913; filed June 12, 1912.

Trunnion Radiator Suspension—Ball trunnions resting on cap plates supported by the frame form the suspension.

The subject-matter of this patent is a radiator support for automobiles which consists of ball trunnions attached to opposite sides of the radiator. Two-part cap plates are removably secured to the trunnions and have internal surfaces which conform to them. They have cylindrical external surfaces and fixed brackets on the side frames which have cylindrical bearings inclosing the cap plates and permitting limited longitudinal sliding movement.

No. 1,056,874—to James E. Woodbridge, Bridgehampton, N. Y., assignor to F.I.A.T., Poughkeepsie, N. Y. Granted March 25, 1913; filed June 28, 1907.

By Way of Correction—In the March 27, 1913, issue of THE AUTOMOBILE by mistake Joseph Borovitz was announced as being appointed chief engineer and factory manager of the Croxton Motor Car Co., Washington, Pa. He has not been engaged by the company.

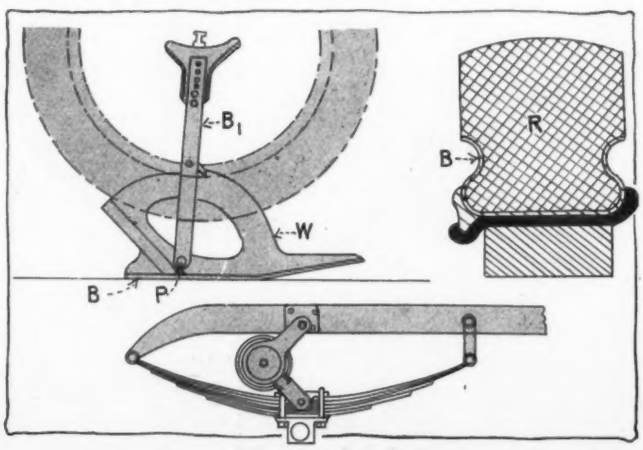


Fig. 4—Adams automobile back. Fig. 5—Divine automobile tire. Fig. 6—Sowden shock absorber